INDIA
RUBBER WORLD

OUR
63rd YEAR

A BILL BROTHERS PUBLICATION

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JANUARY, 1952

STERLING-V New GPF Oil Furnace Black

Another Cabot First In The Industry

BOSTON – Godfrey L. Cabot, Inc., world's largest manufacturer of carbon blacks, just recently announced the commercial availability of Sterling V – a new General Purpose Furnace black made from oil – first of its kind ever to be produced. Sterling V is unique, because it is the first black in history to offer in a single grade an unusual combination of HMF modulus, SRF resilience, and typical oil black smooth extrusion. It is this rare combination that qualifies Sterling V – V for Versatile – for use in an amazing number of different rubber products.

The superior resilience properties and high modulus of Sterling V recommend it for use in tire carcasses, side wall and tread base stocks. The new black's improved processing characteristics lend it to the production of mechanical, wire, footwear and extruded goods in general. Because of the versatility possible with Sterling V application, Cabot has proposed a new classification, namely GPF – General Purpose Furnace.

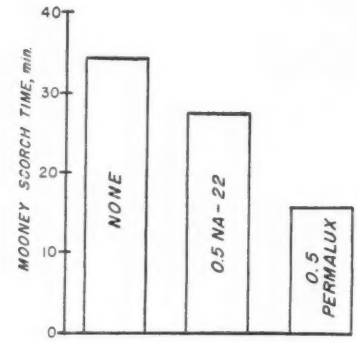
Development of Sterling V is another step in the Cabot plan, initiated ten years ago, to meet threatened gas shortages and rising natural gas prices. The Cabot goal is to produce a complete range of high quality blacks from raw materials not subject to the economic pressures affecting natural gas.

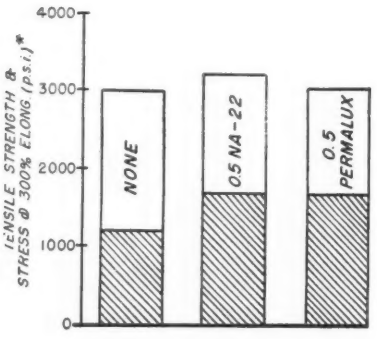
CABOT

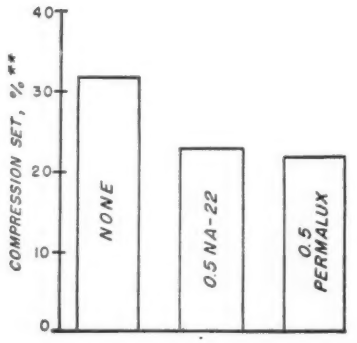
TEST RECIPE

Neoprene Type GN	100.0
NEOZONE A	2.0
Stearic Acid	0.5
Extra Light Calcined Magnesia	4.0
SRF Carbon Black	29.0
Zinc Oxide	5.0

Acceleration as Shown







*Specimens cured 10 min. (a) 307° F.

**Specimens cured 40 min. (a) 307° F

Set determined at 30% constant deflection in accordance with ASTM D 395.

Du Pont NA-22

An outstanding neoprene accelerator for fast, tight cures at *minimum* cost and *maximum* safety

In Neoprene Types GN, GN-A and RT stocks, NA-22 combines powerful activation at curing temperatures with excellent processing safety. Data in the graphs shown here compare the effectiveness of NA-22 with that of Permalux in a Type GN stock. NA-22 is considerably less expensive than Permalux. Yet it provides the same high state of cure in the same time and is much safer, as shown by the Mooney scorch data. There are other advantages, too; NA-22 provides increased heat resistance, is non-staining and non-discoloring. And NA-22 exhibits a slight delayed action which permits better mold flow.

With the other neoprenes, too, NA-22 has been found to be unusually efficient. In Type FR it provides a balance of properties which include good heat resistance and processing safety. Type W compounds containing NA-22 are characterized by excellent set properties and exceptional heat resistance.

If you have not tried NA-22 in your neoprene stocks we strongly urge you to do so. We will be glad to provide samples for your evaluation. For complete information on NA-22 consult Report 50-1. If you've misplaced your copy, see your Du Pont representative or write:

RUBBER CHEMICALS DIVISION
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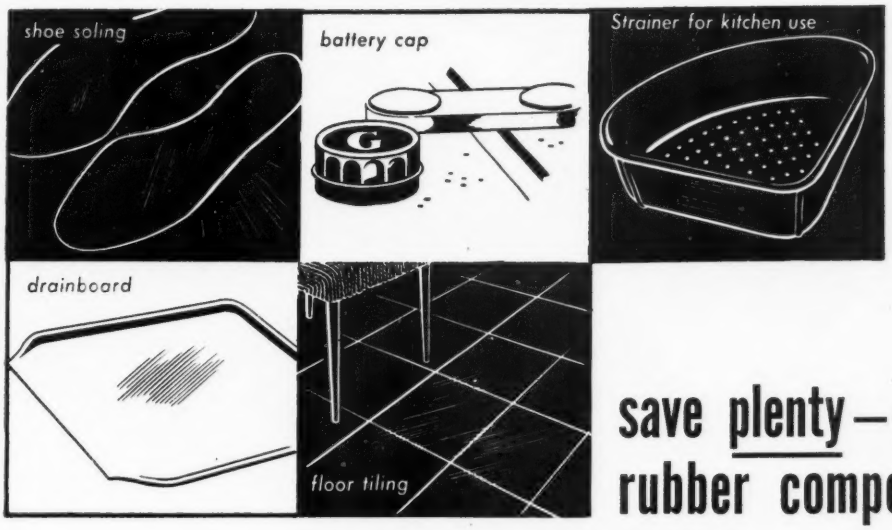
BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

INDIA RUBBER WORLD, January, 1952, Vol. 125, No. 4. Published Monthly by BILL BROTHERS PUBLISHING CORP., Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription United States and Mexico, $3.00 per year; Canada $4.00; All Other Countries $5.00; Single Copies 35 Cents. Address Mail to N. Y. Office.

News about

B. F. Goodrich Chemical Company *raw materials*



save plenty—get improved rubber compounding, too!

...with Good-rite RESIN 50

HERE'S an easy-processing, reinforcing agent that cuts rubber compounding costs—and helps you get improved finished products.

First big advantage of Good-rite Resin 50 is that it provides a new and simple compounding approach to hardness problems. As an example—it's a means of filling in the gap between soft rubber compounds and ebonites.

Good-rite Resin 50 brings *more* advantages. It saves time by eliminating masterbatching. Your rubber compounds gain better flex life, higher elongation, improved abrasion resistance. They are more easily handled because Resin 50 acts as a plasticizer at processing temperatures.

For extruded shapes such as gaskets, tubing, coving, etc., especially on hard compounds, Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

A white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide range of colors. Send for technical information. Find out how Good-rite Resin 50 can give you *better* results at *lower* costs. Just write Dept. CB-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

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A Division of The B. F. Goodrich Company

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GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

The toughest low-cost tire we know

Teams Philblack* A *with* Philblack* O!

What a combination! Tire treads made with Philblack A and Philblack O laugh at cuts, cracks and abrasion!

Try this team for a tough, long-lived rubber compound for use in original treads, camelback, conveyor belts, etc. Blends of premium Philblack O and lower cost Philblack A help reduce costs while maintaining top quality in the finished product.

Tested in the laboratory by rubber torturing machines that would put the Inquisition to shame . . . tested under all driving conditions on the road . . . tire treads made with Philblack A and Philblack O turn in remarkable records every time.

The Philblacks are shipped in bags or in bulk in hopper cars designed for easy unloading.

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West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Start the New Year Right

BY CALLING ON CHEMICAL

TO PROCESS — ACCELERATE — PROTECT YOUR RUBBER PRODUCTS

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LAUREX, activator
Kralac A, high styrene resin
BWH-1, plasticizer
ESEN, retarder

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Division of United States Rubber Company

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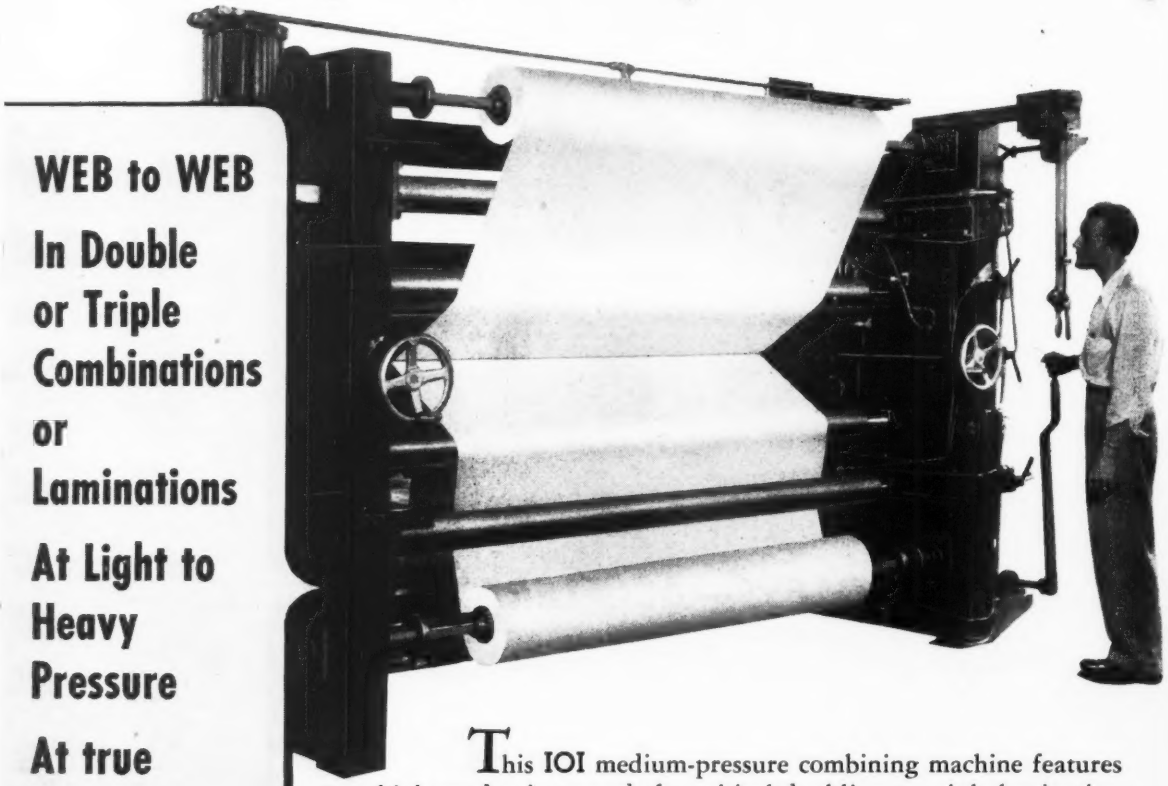
Combining...Doubling...Laminating



WEB to WEB

In Double or Triple Combinations or Laminations

At Light to Heavy Pressure

At true Constant Tension and Variable Speeds

This IOI medium-pressure combining machine features high production speeds for critical doubling or triple-laminating operations. It is available in a variety of face widths, ranging from 36 to 96 inches. The machine pictured has a 90 inch face width.

Sandwich thickness is accurately controlled by micrometer roll spacers. All unwinding and windup heads are driven at true constant tension by a sensitive, variable-volume, variable-pressure fluid drive. Threading speeds down to 12 inches per minute are provided, as well as a reverse drive for easy stock handling and triple combining.

Lateral register is built into each unwinding head. Adjustable edge slitters are also incorporated. The unit will handle previously coated webs of pressure-sensitive materials. It can be used in conjunction with IOI fusing equipment for thermo-setting vinyl-based and other types of adhesives.

Variations of this machine's basic design are available for any roll face, operating speed or combining pressure.

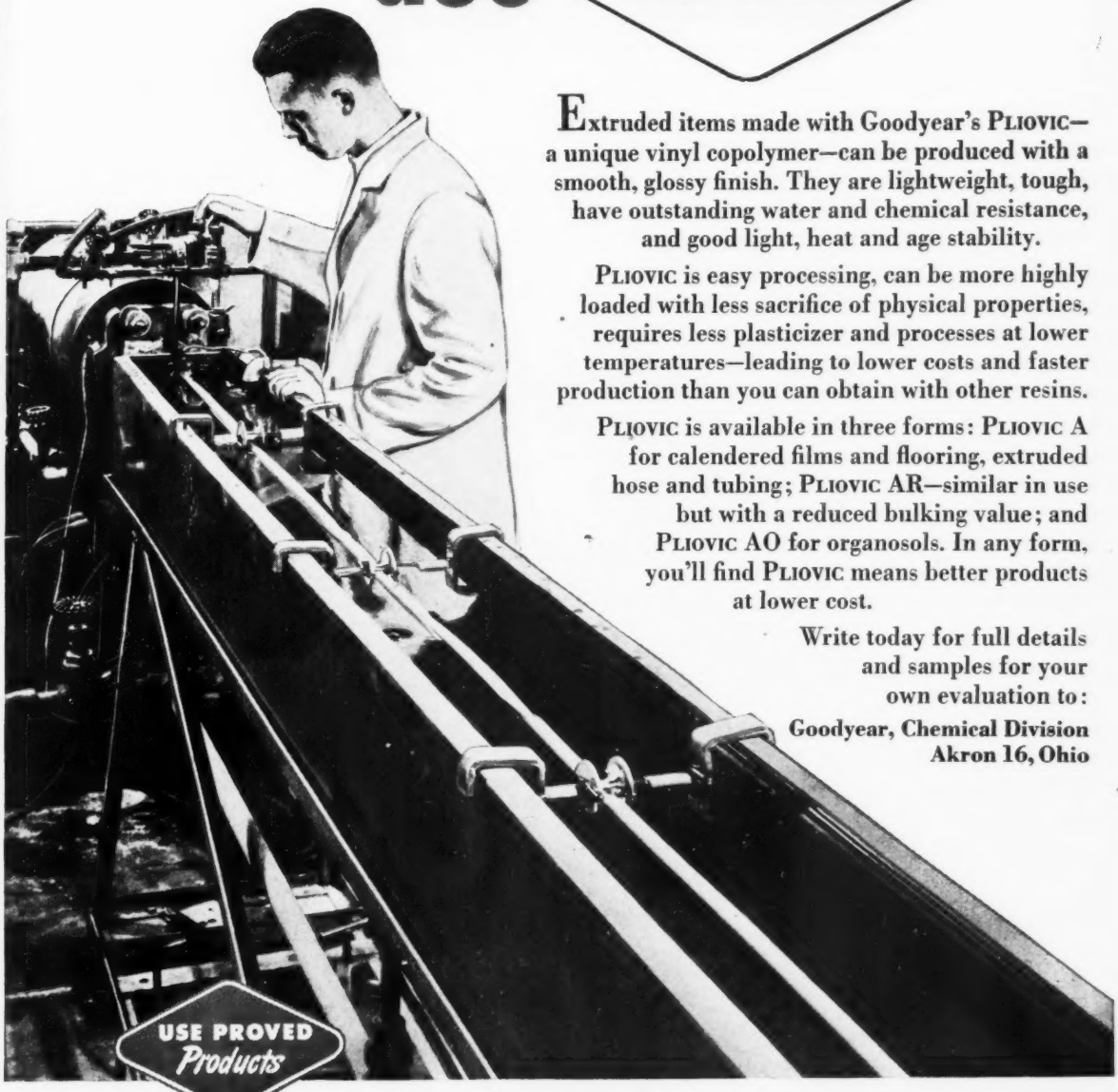
An **IOI** engineer will be glad to show you how this machine can be applied to your particular processing requirements. Write on your business letterhead for further information.

INDUSTRIAL IOI OVENS, INC.

IOI ENGINEERING VERSATILITY

13825 TRISKETT ROAD CLEVELAND 11, OHIO

For better extrusions use PLIOVIC



Extruded items made with Goodyear's PLIOVIC—a unique vinyl copolymer—can be produced with a smooth, glossy finish. They are lightweight, tough, have outstanding water and chemical resistance, and good light, heat and age stability.

PLIOVIC is easy processing, can be more highly loaded with less sacrifice of physical properties, requires less plasticizer and processes at lower temperatures—leading to lower costs and faster production than you can obtain with other resins.

PLIOVIC is available in three forms: PLIOVIC A for calendered films and flooring, extruded hose and tubing; PLIOVIC AR—similar in use but with a reduced bulking value; and PLIOVIC AO for organosols. In any form, you'll find PLIOVIC means better products at lower cost.

Write today for full details and samples for your own evaluation to:

Goodyear, Chemical Division
Akron 16, Ohio

GOODYEAR

Pliovic—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

You can double the life of your vinyl compounds . . .

with DYPHOS

"Dutch Boy" Stabilizers

PRODUCT	USE
TRIBASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat-stability
TRIBASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light. Good electrical properties
DYPHOS (Di-basic Lead Phosphite)	Outstanding for heat and light in all opaque stocks, including plastisols and organosols
NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light-stability

Dutch Boy* CHEMICALS

*Reg. U. S. Pat. Off.

Greatly increased service life for your opaque vinyl products—unequalled light- and heat-stability—excellent color retention—lasting flexibility . . . these are advantages of stabilizing with "Dutch Boy" DYPHOS.

"Dutch Boy" DYPHOS is effective in upgrading quality because it has all four properties of the ideal stabilizer:

(1) Acid acceptor; (2) Reactive molecule; (3) Anti-oxidant; (4) Ultra-violet light screening agent.

This is shown by accelerated tests in the laboratory and by actual exposure tests.

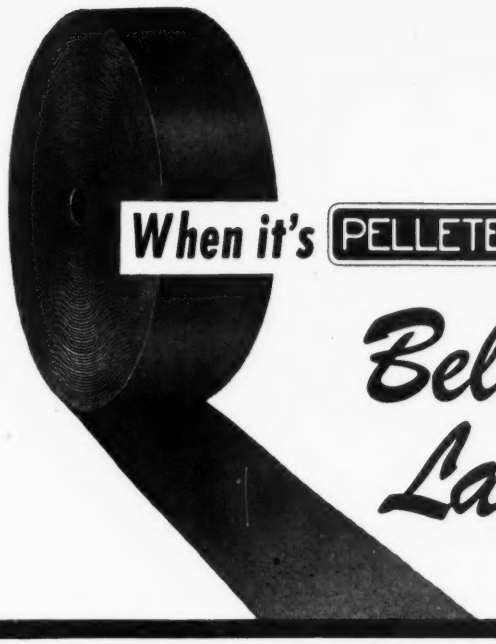
Most vinyl formulations with DYPHOS show a *useful life at least twice* that of similar compounds using other stabilizers.

DYPHOS is recommended for high-quality vinyl compounds, including plastisols; also for systems using chloroparaffins as secondary plasticizers.

For complete factual data on DYPHOS and other "Dutch Boy" chemicals . . . for technical assistance in evaluating their use in your operations . . . write us.

NATIONAL LEAD COMPANY

111 Broadway, New York 6, N. Y.



When it's PELLETEX you KNOW...

Belts give Lasting Service

PELLETEX®

PELLETEX SRF carbon black is absolutely essential to the manufacture of best quality belts – the kind that show superior aging, resistance to flexing, fatigue, tear and abrasion.

The reason for this is that PELLETEX has properties superior to those of every other SRF black – it gives exceptional performance in friction, cushion and cover – and at low volume cost. PELLETEX ease of handling and processing, with high loading capacities, make it first choice among compounders throughout the entire mechanical rubber goods field.

PELLETEX is the one black on the market able to give all types of belting rubber compounds the necessary qualities for long-lasting, dependable service. Ask for PELLETEX.

The GENERAL ATLAS Carbon Co.

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applications of

VELSICOL RESINS

FOR RUBBER COMPOUNDING

GE-9—AB11-4—AB11-2

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TUBULAR COMPOUNDS
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COLORED RUBBER STOCKS
BATTERY CASES
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features:

1. THERMOPLASTIC HYDROCARBON RESINS.
2. COMPATIBLE WITH NATURAL AND SYNTHETIC RUBBERS.
3. EFFECTIVE PLASTICIZERS AND SOFTENERS... in highly-loaded clay stocks or in recipes incorporating carbon black.
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8. POSSESS HIGH ELECTRICAL RESISTANCE PROPERTIES.
9. AID IN THE DEVELOPMENT OF NON-SCORCHY STOCKS... without excessive retardation of cure at high temperatures.

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Use United Blacks

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NEW YORK • AKRON • CHICAGO • BOSTON

KOSMOS 40

balances your

REQUIREMENTS

WITH ALL THESE ADVANTAGES

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Wide Flexibility
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Low Heat Build-Up
High Resiliency
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Standardize on KOSMOS 40 — a high modulus furnace black (HMF) for good economy, outstanding performance and all-around satisfaction.

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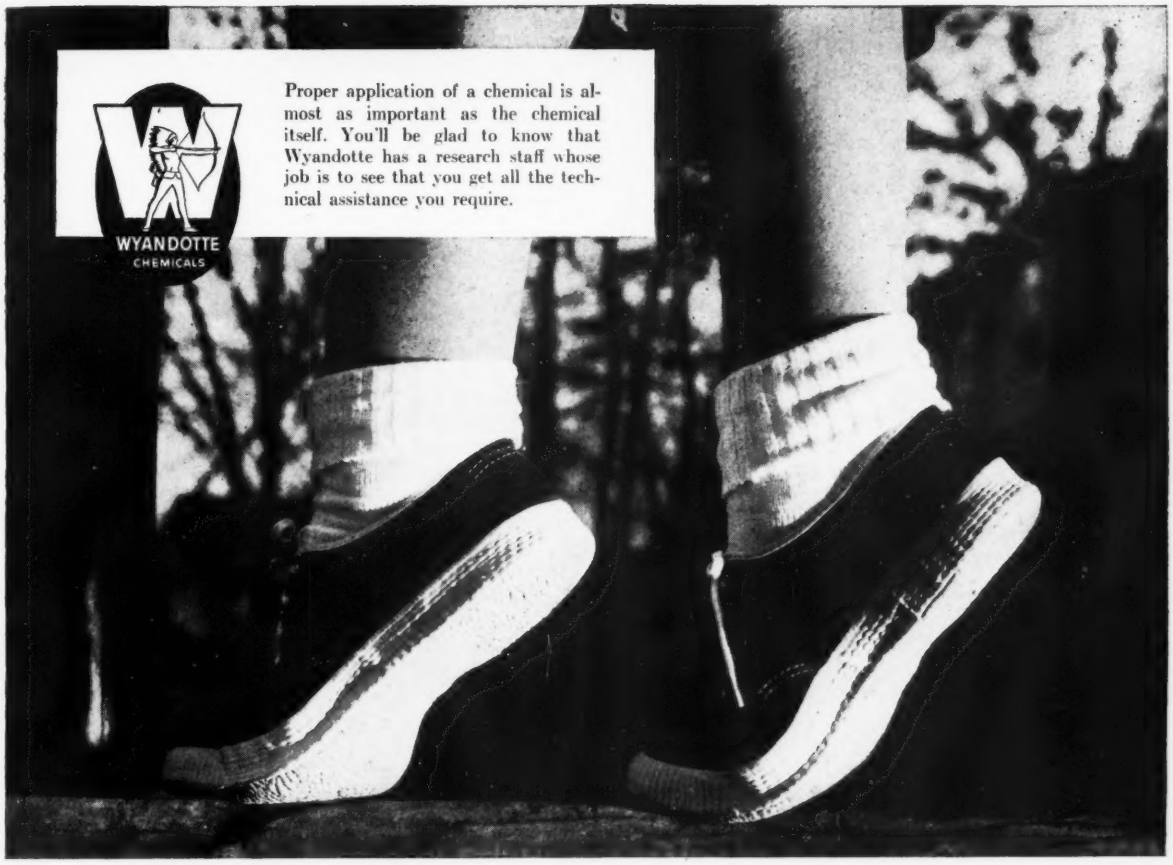
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Proper application of a chemical is almost as important as the chemical itself. You'll be glad to know that Wyandotte has a research staff whose job is to see that you get all the technical assistance you require.

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Soles grip better, wear longer! Can YOU use PURECAL T profitably?

Treat Wyandotte PURECAL*T exactly as you would a carbon black, and get these improved properties:

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The Problem: A manufacturer wanted to build more safety, tear-resistance, and wear into rubber soles.

The Solution: *Reformulation, using Wyandotte Purecal T, an ultrafine reinforcing filler — not as an ordinary calcium carbonate, but exactly as they had been using carbon black.*

The Results: Soles with extreme flexibility; good grip on slippery, dangerous surfaces; and unusually long life.

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Purecal T gives you building tack in an all GR-S stock . . . it promotes knitting.

Purecal T lessens "nerve," makes smoother stocks, extends GR-S.

Purecal T has high abrasion resistance for a calcium carbonate . . . approaches that of the best clays.

Purecal T is snow-white . . . non-discoloring.

Purecal T is one of Wyandotte's family of precipitated calcium carbonates. Do you have any production problems that Purecals might improve or that our technical service may help you with? Write to *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in Principal Cities.* *Trademark

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RECOMMENDED FOR

Synthetic Rubber

EFFICIENT, ECONOMICAL LOW TEMPERATURE (80°F) *Plasticizers*

Ricinoleate Esters are fully equivalent and in many instances superior to the commonly used commercial plasticizers employed when low temperature flexibility is required. For flexibility in the range of −80° F, depending on choice of rubber, the following are highly recommended:

Ricinoleate Esters

25% NITRILE RUBBER — PG-16, Butyl Acetyl Polyricinoleate

40% NITRILE RUBBER — P-4, Methyl Acetyl Ricinoleate

NEOPRENE GN — P-6, Butyl Acetyl Ricinoleate

GRS — P-4, Methyl Acetyl Ricinoleate

Samples will be sent promptly on request. Please use the convenient coupon or clip it to your letterhead for quick service.

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Please send samples of the Ricinoleate Esters checked or Technical Bulletin.

☐ PG-16 ☐ P-4 ☐ P-6
☐ Technical Data

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ROLLS which, in addition to being chamber-bored, are drilled longitudinally through the shell to provide more effective temperature control and greater uniformity of temperature across the entire roll face.
ROLL ADJUSTMENT that is motor-operated for quick and accurate control of gauge while the batch is on the mill, with vernier dial indicators to show roll movement in thousandths of an inch.
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Farrel-Birmingham is prepared to engineer a mill with any combination of design features and attachments necessary to fill your needs. Physical proportions, method of heating or cooling the rolls, gauge control, prevention of stock contamination — in fact, every detail of construction can be worked out to fit your requirements.

Furthermore, almost any "special" mill can be furnished from existing drawings and patterns — because, in a century of building processing machinery, Farrel-Birmingham has designed mills for almost every conceivable application. This means that, ordinarily, you can obtain the exact mill you require in a design that has been proved in service.

FB-691

For further details of Farrel-Birmingham mills, send for a copy of Bulletin 173. No cost or obligation.
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Butyl Reclaim Is NOT *Under Allocation*

PEQUANOC'S #5950
Butyl Reclaim

for use in **GR-I**
compounds where ozone resistance is important-

In your GR-I compounds use Pequanoc's 5950 butyl reclaim for better ozone resistance. Pequanoc butyl reclaims are *not* under allocation. A typical formula follows:

OZONE RESISTANT PEQUANOC COMPOUND A-174-4

GR-I	30.20
5950 Butyl reclaim	39.80
Stearic Acid	.35
Zinc Oxide	2.60
Dutrex #6	2.75
Sulfur	1.05
Mercaptobenzothiozole	.27
Tetramethylthiuram disulfide	.53
Tellurium diethyl dithio carbamate	.18
HMF black	22.27
	100.00

Tensile	1500# psi Min.
Elongation	350% Min.
Lb. Cost	$.1610
Specific Gravity	1.21
Volume Cost	$.1948

Extrusion compound for R615a Channel Rubber, etc. ASTM D 735-51T.

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now

With the new multi-million dollar pigment expansion at the Barberton, Ohio Plant, Columbia-Southern now can supply Hi-Sil and Silene EF in greatly increased volume.

Since supply is in better balance, rubber compounders can turn development work on new or improved products into full production, *at lower volume costs*. Whether your process covers natural or GR-S, butyl or Neoprene—Hi-Sil and Silene EF call for detailed examination.

If your experimental work has not included Hi-Sil or Silene EF, write for the Columbia-Southern bulletins now available on the use of these versatile, non-black reinforcing pigments in various elastomers.

For better compounds, at lower volume cost, put quality in your product with Hi-Sil and Silene EF. Contact your nearest Columbia-Southern office for prompt attention.

SILENE EF—Precipitated hydrated calcium silicate; particle size .03 micron; 2.10 sp. gr. It imparts high modulus, good tensile, high tear and abrasion resistance.

HI-SIL—precipitated hydrated silicon dioxide; particle size .025 micron; 1.95 sp. gr. It imparts high modulus, tensile and tear and extremely high abrasion resistance.

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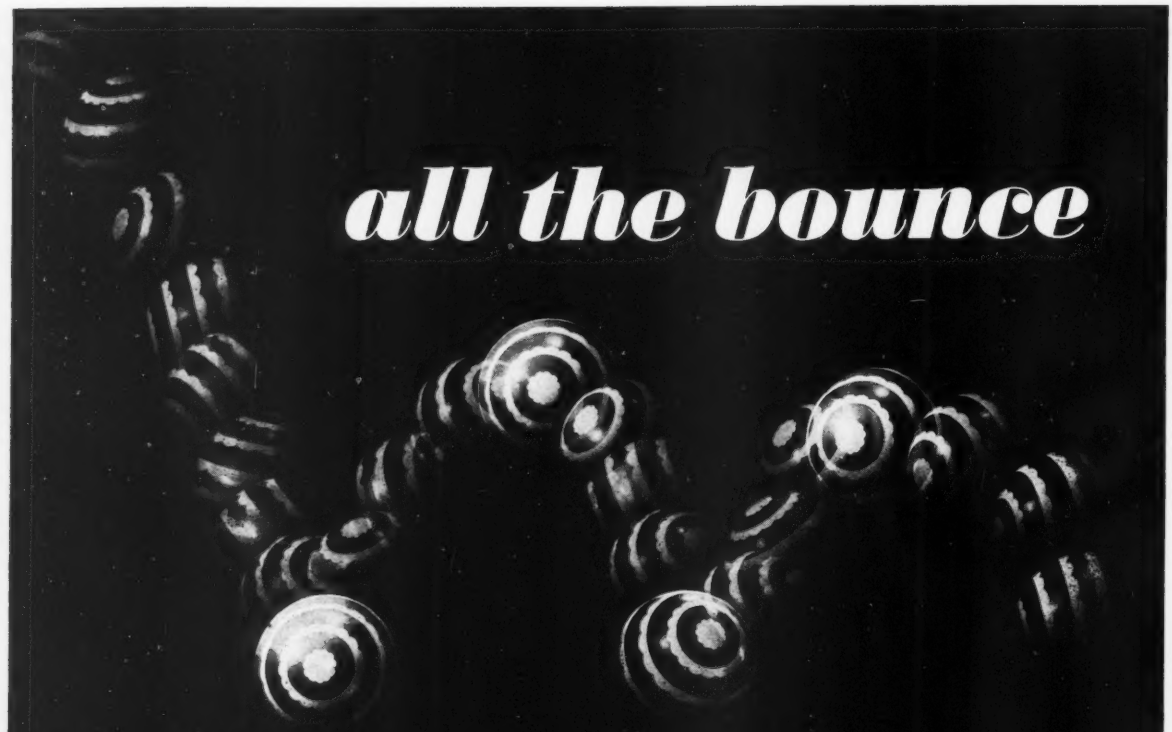

all the bounce

and color, too...

From rubber balls to balloon tires . . . natural rubber or synthetic . . . whiter, brighter rubber products are gained with Titanox pigments. Compatible with all types of rubber, Titanox pigments add quality by imparting maximum brightness and opacity to white or tinted products while maintaining natural strength and life.

For pure gum and lightly loaded stocks, TITANOX-A and TITANOX-RA assure desired whiteness or brightness at minimum loading, thus maintaining flexibility. For heavily loaded stocks specify TITANOX-RCHT, the extended pigment preferred for economical whiteness and brightness. Latex rubber articles are best pigmented with TITANOX-A-LO or TITANOX-AWD, both exceptionally stable and readily dispersible to yield smooth, strong films.

If you have a pigmentation problem Titanox Technical Service is always available. See your Titanox representative or write Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

® TITANOX

the brightest name in pigments

9616

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WORLD

Six Million Malayans

...are your friends and allies

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They are for freedom of speech, religion and enterprise. Their new Federation of Malaya is the "United Nations" idea at work, with Asians and Europeans working together to build a new country. Malaya is a keystone for democracy and a barrier against the spread of Communism in Southeast Asia.

You Are Their Best Customer

Six million Malayans must export to live. And 85% of their income from exports comes from rubber and tin, sold mostly to America.

Rubber Is Their Chief Cash Crop

They sell it on a free market, but, as allies of democracy, have banned exports to Red China. Rubber is grown by 350,000 independent rubber farmers as well as by more than 1,000 large rubber plantations. Production has been maintained in spite of constant attacks by Red bandits. This rubber has made possible America's present strategic stockpile.

The Rubber Planter Has Fought the Reds for Four Years

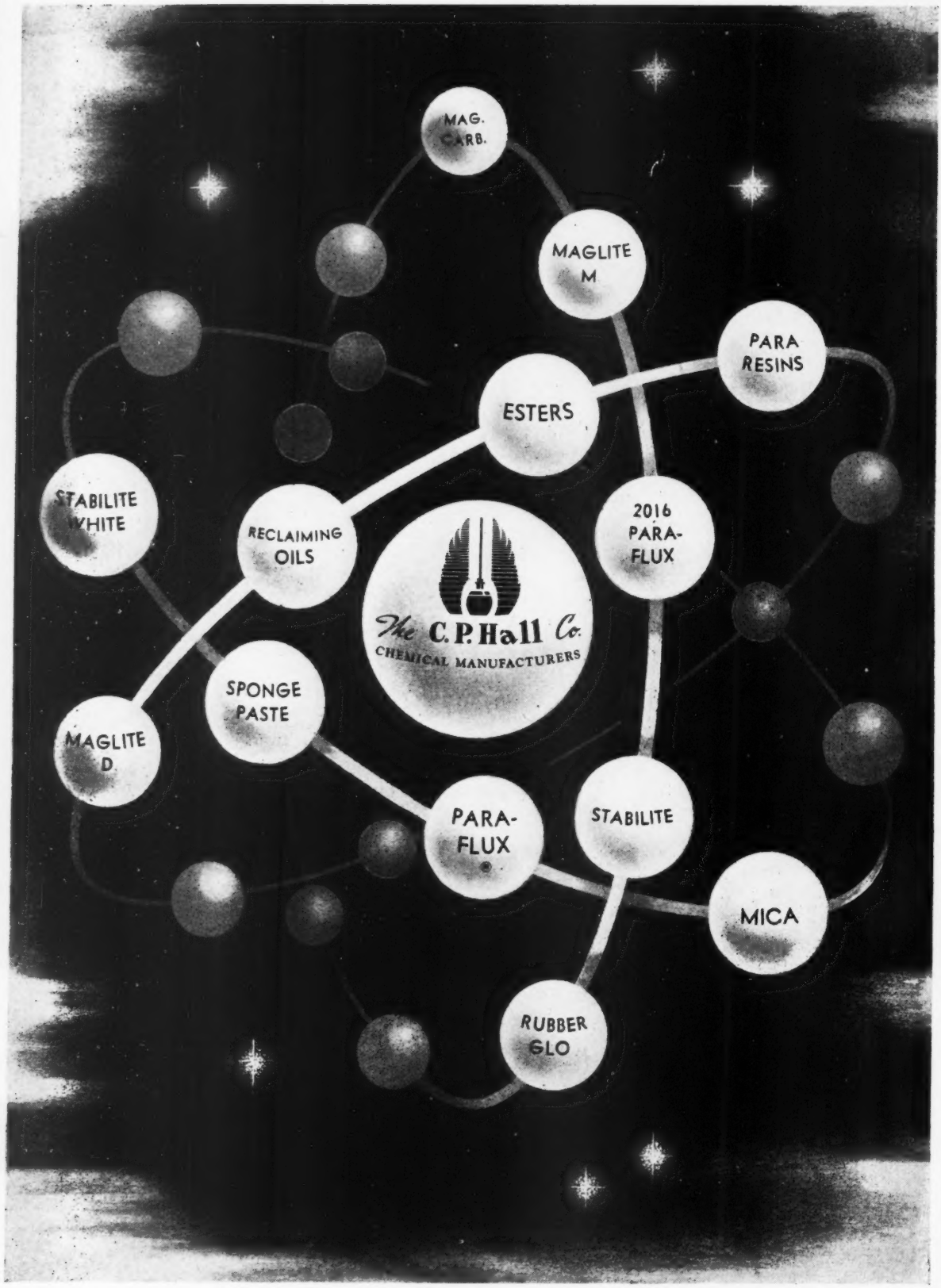
Regular army and police forces, 100,000 strong, have been holding Malaya against Red aggression for four years. SO HAS THE RUBBER PLANTER. His plantation is the front line in the fight against Communism in vital Southeast Asia.

This advertisement published by the

Natural Rubber Bureau

1631 K STREET, N.W., WASHINGTON 6, D.C.

to promote greater understanding in America of its friend, ally, and supplier in Southeast Asia — the Malayan rubber grower. Write for free booklet — "NATURAL RUBBER AND YOU."



AKRON, OHIO ● LOS ANGELES, CALIF. ● CHICAGO, ILL. ● NEWARK, N. J.

UNIFORMITY

Makes the Big Difference

In INDUSTRIAL Fabrics

MT. VERNON FABRICS Give You Greater Fabric Uniformity

Shown above is one of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. The unit shown automatically tests 6 strands of yarn at one time.

Mt. Vernon-Woodberry Mills

Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles

TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST NEW YORK

Experiments sometimes cause trouble...

Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.

SKELLYSOLVE C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve B.

SKELLYSOLVE D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds.

SKELLYSOLVE H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve D is desired.

SKELLYSOLVE E. For use wherever a relatively slow drying solvent is desired.

SKELLYSOLVE R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency.

"DOC" MacGEE SAYS: Why risk unnecessary experiments by trying out something "just as good as" Skellysolve. You take no chances with the quality of your product or of balling up your plant operations when you standardize on Skellysolve—a fact that's been proved over and over again for more than 20 years.

First of all, Skellysolve is noted for its uniformity. Every batch has the same over-all properties to protect your *product's* high quality . . . to fortify its sales appeal, as well as to give trouble-free operations in your plant. Skellysolve's uniformity is assured by strict laboratory controls, unsurpassed manufacturing methods, and the "will to do" that stems from pioneering and major product operations. Skellysolve is not a "side-line" venture.

Test Skellysolve for every feature that is important to you. Check its low end point, quick evaporation, low vapor pressure, its minimum of unsaturates and pyrogenic decomposition products.

See why Skellysolve's minimum of low and high boiling compounds means reduced rejects due to blushing and blisters. Note the controlled vapor pressure to guard against bloated containers. What's more, the minimum of low boiling compounds means no "seeds" in rubber cements . . . with high bonding strength assured by freedom from greasy residues.

For more complete technical facts, write now. And ask about special help on solvent applications from the Skellysolve Technical Fieldman.

SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

KAMLOK COUPLING ASSEMBLIES

The Fastest Surest Coupling Known!

KAMLOKS positive seal all along the line assures *greater safety* in handling any type of liquid. A perfectly tight no leak connection is made in seconds by sliding coupler over adaptor, then pressing cam levers. No threads to engage, no twisting friction against gaskets, no tools required. KAMLOKS provide long years of economical trouble free service.

Available in any combination to meet coupling requirements in sizes from ¾″ to 4″ inclusive. Sizes ¾″ to 3″ precision machined of special hard wear resistant bronze. 4″ size of hi-tensil OPALUMIN, (OPW hi-tensil aluminum alloy, as strong as bronze, one-third the weight)—4″ in bronze on special order.

Parts A, E, F, are interchangeable with parts B, C, D, G, H, in the same size.

Write for Bulletin F-3 for the KAMLOK Story

OPW

OPW CORPORATION

2735 COLERAIN AVE. • CINCINNATI 25, OHIO

Valves • Fittings • Assemblies • For Handling Hazardous Liquids

ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

PROPIONATE COATING ADDS NOVEL FEATURES TO ZINC OXIDE

Rubber compounders and production men alike, in recent years, have helped to write a new chapter in the book of zinc oxide knowledge. For they have found, as they increased their use of zinc propionate coated zinc oxide, that this pigment—Protox-166*—has some advantages not available in untreated oxide.

Several of those features of Protox-166 have been described in detail in previous issues of ACTIVATOR NEWS, and others will appear here later. For your convenience, the list of such properties is shown in the attached table. If you have not yet evaluated Protox-166 in your compounds, we shall be glad to send you samples.

PROTOX-166 GIVES YOU ALL THESE ADVANTAGES

(COMPARED WITH ZINC OXIDES NOT OF THE PROTOX TYPE)

FEATURES OF PROTOX-166	HOW YOU PROFIT
LOWER DRY BULKING	LESS STORAGE SPACE LARGER BATCHES MORE OUTPUT
LOWER MOISTURE PICKUP	FASTER MIXING
ORGANOPHILIC COATING	QUICKER INCORPORATION BETTER DISPERSION LOWER POWER CONSUMPTION EVEN ACTIVATING AMOUNTS SPEED MIXING OF CARBON BLACKS
SCORCH INHIBITION	MORE PRODUCTION
PLASTICIZING EFFECT	FASTER, SMOOTHER TUBING AND CALENDERING REDUCES DIE SWELL CUTS CALENDER SHRINKAGE GIVES COOLER-RUNNING STOCKS
HIGHER REINFORCEMENT	IMPROVED TENSILES BETTER TEAR RESISTANCE HIGHER MODULUS GREATER RESILIENCE
MINIMUM PROGRESSIVE CURE, EVEN WITH PERSISTENT ACCELERATORS	LONGER SERVICE LIFE

**U. S. Patents 2,303,329 and 2,303,330*

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

DOUBLE-CHECKED ✓ CHEMICALS FOR THE RUBBER INDUSTRY

TETRAMETHYLTHIURAM DISULFIDE

AVAILABLE IN 3 FORMS

to meet your specific requirements

SHARPLES ACCELERATOR 52-0

Powder form, untreated.

SHARPLES ACCELERATOR 52-1

Powder form, treated with 2% mineral oil to reduce dusting and improve dispersability in mill-mixed stocks.

SHARPLES ACCELERATOR 52-9

Xtruded form. Treated with inert rubber-soluble binder. Free flowing, dustless, with improved dispersability.

USES:

Primary Accelerator
Secondary Accelerator
Vulcanizing Agent

For further information, write to Dept. P.

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

PHILADELPHIA • NEW YORK • CHICAGO • AKRON

OUTSTANDING
PROCESSING
PROPERTIES
PLUS
A HIGH DEGREE
OF TACK

POLYMEL 6

a black, solid, friable hydrocarbon resin that provides a high degree of tack.

POLYMEL 6 is outstanding in the processing properties it imparts to GR-S, cold rubber and natural rubber compounds. It is useful in a variety of compounds but is especially efficient where building tack is required, such as tire carcass and tread compounds, camelback, footwear, braided hose, etc.

POLYMEL 6 has high insulation resistance, low capacitance and low power factor, thus making it an excellent product for wire insulation, friction and rubber tape, and hard and soft rubber electrical specialties.

Comparison in a Typical GR-S Compound with Physical Test Results

	A	B
GR-S	100.	100.
Zinc Oxide	2.5	2.5
EPC Black	45	45
Sulfur	2.	2.
Agerite Resin D	1.	1.
Santocure	1.2	1.2
POLYMEL 6	—	10.
Coal Tar Softener	10.	—

	A	B
Modulus:		
300%	920	1200
500%	2160	2540
Tensile, psi	2900	3340
Elongation, %	580	600
Hardness	63	62
Tear	250	318
Permanent Set	30	29

Optimum Cure—60 min. @ 280° F.

GOODRICH FLEXOMETER DATA

Stroke 175 **Load 175**

	A	B
Cure	60′	60′
Hardness	58	60
Height Change	—.153	—.090
Final Temperature	259	211
Static Comp.	338	274

POLYMEL 6 may also be used in reclaiming synthetic scrap by cold plasticization. For further information, write today.

PRICES REDUCED! Now—6¾c lb. in drum lots
5¾c lb. in truck loads or more
fob Piscataway, New Jersey

REPRESENTATIVES:
EASTERN: H. M. ROYAL, INC., TRENTON, N. J.
WESTERN: MERIT-WESTERN CO., LOS ANGELES, CALIF.

THE POLYMEL CORP.

1800 Bayard Street
Baltimore 30, Maryland
Phone: PLaza 1240

PUT IT TO WORK WITH THE PROPER MILL . . .

A BOLLING SPIRAL-FLOW INTENSIVE MIXER

THIS "TEAM" CAN DOUBLE, TRIPLE, PERHAPS EVEN QUADRUPLE YOUR PRODUCTION—*AT A LOWER COST.*

No. 4 Bolling Spiral-Flow Intensive Mixer for batch of approximately 150 pounds of 1.5 gravity, with 125 h. p. gear head motor on one-piece base.

Bolling mills are available in suitable sizes for the efficient, economical sheeting of rubber or plastics.

Write today for our new Bulletin "W-1".

Yes, sir, we mean just that! Bolling Spiral-Flow Intensive Mixers have been known to jump production 300% and cut mixing costs 70%. Bolling's 30-year background is ready to show you how you possibly can do likewise. These distinctive Bolling features will help:

1. Spiral-Flow steel sides which turbulate water or steam for hastening maximum heat transfer.

2. Split end frames for rigidity and quick accessibility.

3. Anti-friction bearings maintain true centers, reduce power maintenance and practically eliminate end play in rotors.

B STEWART BOLLING & COMPANY, INC.
3192 EAST 65TH STREET • CLEVELAND 27, OHIO

• INTENSIVE MIXERS AND MILLS • CALENDERS • REFINERS • CRACKERS HYDRAULIC PRESSES • PUMP UNITS BALE SLITTERS • SPEED REDUCERS

Thiokol*

Plasticizers are again available!

IN LIMITED SUPPLY WITHOUT RATINGS

TP-90B

Highly compatible with GR-S, Neoprene, Buna N's and Natural Rubber. Imparts excellent low temperature flexibility and resilience. It is both economical and efficient.

TP-95

For plasticizing Buna N rubbers, GR-M and vinyl resins. Imparts excellent low temperature flexibility or good heat resistance. It is economical and efficient.

TECHNICAL INFORMATION AND SAMPLES ON REQUEST

*THIOKOL, REG. U.S. PAT. OFF.

784 NORTH CLINTON AVENUE

Thiokol CORPORATION

TRENTON 7, NEW JERSEY

Naugatuck
ROYAL FAMILY OF PLASTICS

marvinol rigids put a new product future in your hands

Do you need new **color and lasting beauty for the products you manufacture?**

See what one of Naugatuck's Marvinol Rigids has done with a protective covering for steel tubing. We think that this product—with its resistance to abrasion, corrosion, and flame—will interest you.

The plastic armor Marvinol has created here is called Dekoron®. It is a product of Samuel Moore & Co., Mantua, Ohio. You'll soon see it on stanchions, overhead rails, and seat grab rails of busses. There it sheathes common metals and improves their performance, feel, and appearance—makes them real passenger pleasers.

This Marvinol-based Dekoron comes in brilliant colors which are solid through and through. Their delightful, easy-to-clean color and beauty *will never wear off.*

With the new eye appeal of this Marvinol Rigid, you also get improved structural strength. Neither dirt nor perspiration can harm it. And it feels warm in cold weather, cool in warm weather. Here is highest product quality—*at no premium in cost!*

Of course, there are hundreds more ways to use Marvinol vinyl resins—in rigids, films, sheet, or sponging.

These versatile Marvinol resins—quick to process, uniform in quality—come to you from Naugatuck Chemical. Write on your company letterhead for the facts on Marvinol to the address below.

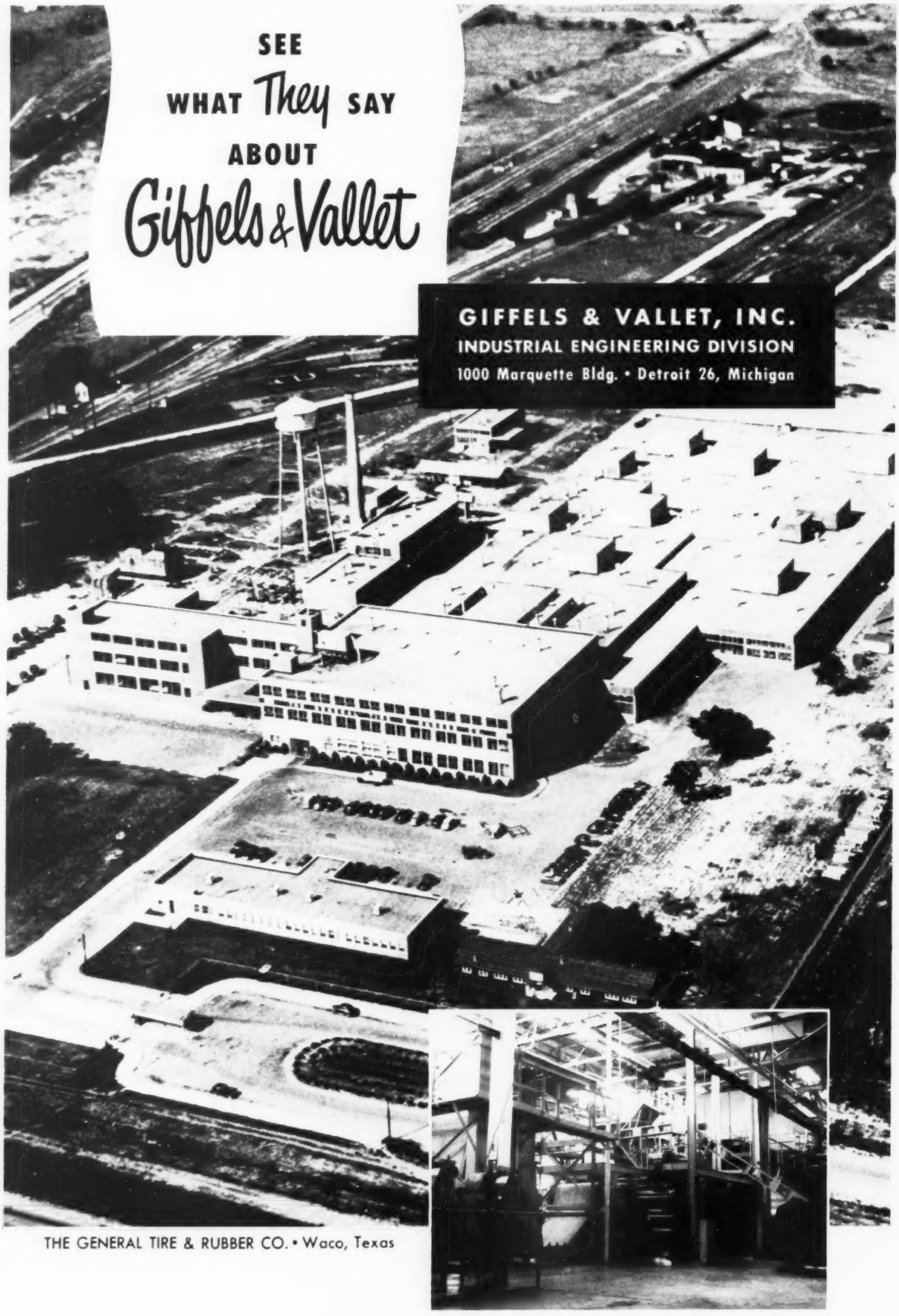
Naugatuck Chemical Division of UNITED STATES RUBBER COMPANY
209 ELM ST., NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario

MARVINOL® vinyl resins • KRALASTIC® styrene copolymers • VIBRIN® polyester resins

Rubber Chemicals
Aromatics
Synthetic Rubber
Agricultural Chemicals
Reclaimed Rubber
Latices

SEE
WHAT *They* SAY
ABOUT
Giffels & Vallet



GIFFELS & VALLET, INC.
INDUSTRIAL ENGINEERING DIVISION
1000 Marquette Bldg. • Detroit 26, Michigan

THE GENERAL TIRE & RUBBER CO. • Waco, Texas

LX-572
LX-777
X-1

If you want a reclaiming oil that . . .

1—fits your particular reclaiming operation,

2—provides low tailings and smooth processing even with mixed GR-S and natural stock,

3—gives controlled tack and improved tensile . . .

then you'll want to investigate the Neville line of Reclaiming Oils.

THE NEVILLE COMPANY
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

• *Write for information*

. . . . . *Chemicals for the Rubber Industry*

R 46

Announcing

MACHINERY and EQUIPMENT for RUBBER and PLASTICS

VOLUME I

PRIMARY MACHINERY AND EQUIPMENT

Now Ready for Press

The only book of its kind ever offered to the Rubber and Plastics Industries and the first to be published since Pearson's "Rubber Machinery" in 1915. Compiled by Robert G. Seaman and Arthur M. Merrill, the present Editors of India RUBBER WORLD, with the cooperation of an Editorial Advisory Board of experts in their respective fields. Each chapter is preceded by an article written by recognized authorities on the equipment, its purposes for specific products, and best method of using it.

Volume I has over 800 pages of editorial content with authoritative descriptions for each machine classification: Types, Specifications, Design Features, Operation, and Applications, as well as names and addresses of the manufacturers or suppliers. More than 300 illustrations. Cloth-bound for permanence.

Send for complete prospectus.

Volume 1 — $15.00 Postpaid

Volume II — Supplementary Machinery and Equipment — is now in preparation and will be published in the near future.

INDIA

RUBBER WORLD

386 FOURTH AVENUE

A BILL BROTHERS PUBLICATION

NEW YORK 16, N. Y.

WORLD

FOUND

TY·PLY

an honest Rubber-to-Metal Adhesive

TY-PLY **Q** for bonding Natural, GR-S, and Butyl

TY-PLY **S** for bonding Neoprene

TY-PLY **BN** for bonding N-types

TY-PLY will adhere most vulcanizable rubber compounds to almost any clean metal surface.

Marbon

MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

TY-PLY has stood the test of time....since'39

A REPUTATION FOR STABILIZATION

The wide range of ADVANCE vinyl resin stabilizers offered to the industry has achieved a well-earned reputation. Wherever stabilization is required — against heat or light degradation or for other specific stabilization qualities — there is an ADVANCE product to fill the need.

Standard ADVANCE stabilizers, developed through many years' research, include #3; #52; #21; E6B; V-1-N; JCX; VL-3, and BC-12. *For complete data or special problems, call, write or wire.*

ADVANCE SOLVENTS & CHEMICAL CORP.

245 Fifth Avenue · New York 16, N. Y.

TANNEY-COSTELLO
INCORPORATED

NATURAL & SCRAP RUBBER — PLASTICS & SYNTHETICS

P. O. BOX 1112
868 E. TALLMADGE AVE., AKRON 9, OHIO

REPRESENTATIVES FOR:

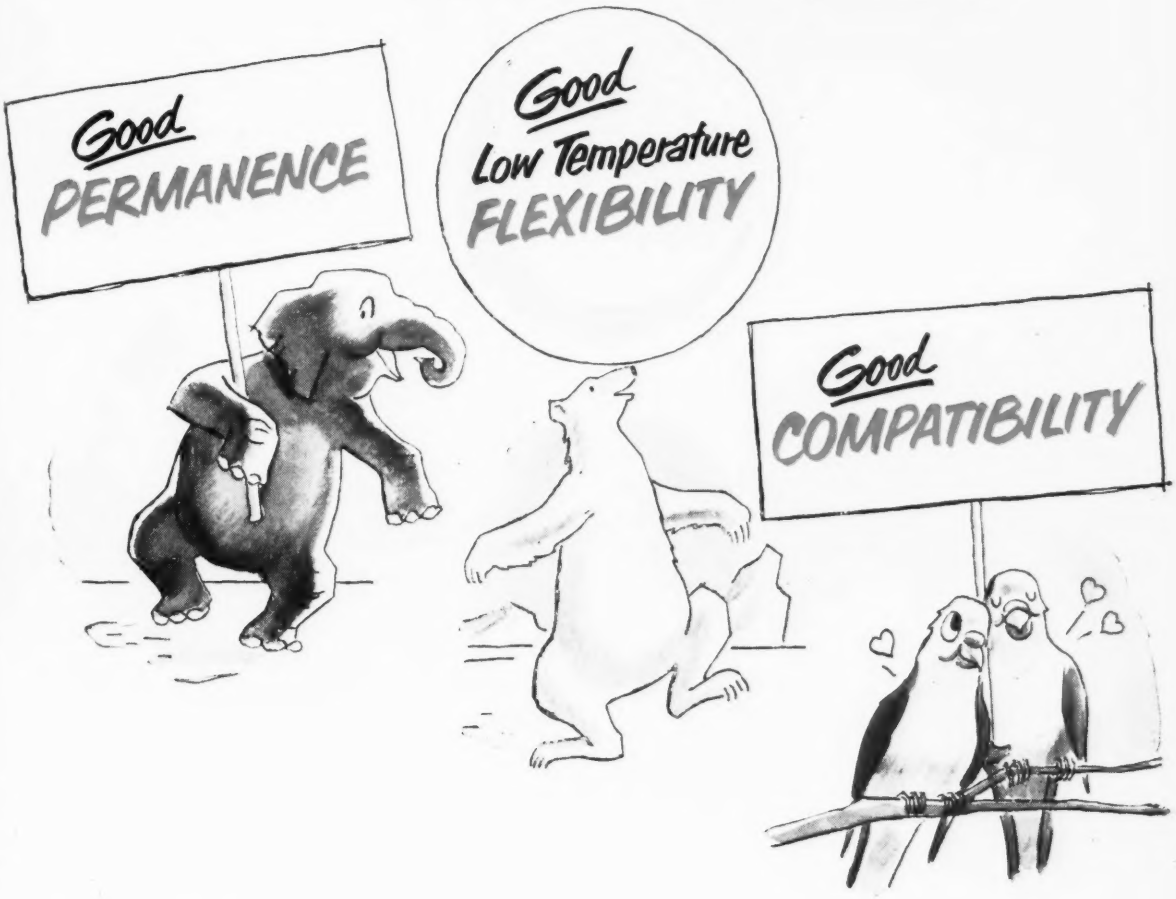
S. J. PIKE & CO., INC.

Rubber — Natural and Synthetic

30 CHURCH STREET, NEW YORK 7, N. Y.

PITTSBURGH PX PLASTICIZERS

Give You All Three!



Pittsburgh PX Plasticizers give you the high degree of permanence, low temperature flexibility and compatibility you want in your plastic products. And you can *depend* on these advantages in every shipment.

As a basic and integrated producer, we're able to closely control the quality and uniformity of Pittsburgh PX Plasticizers from coal to finished product—a factor that assures you better performance and more consistent results.

Because of the great demand for plasticizers today for both military and civilian use, we're expanding our production facilities to help meet these needs. We'll be glad to send you samples and specification sheets or provide any technical assistance you require. *Write today!*

PX-104	DiButyl Phthalate
PX-108	DilsoOctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DilsoOctyl Adipate
PX-238	DiOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DilsoOctyl Sebacate
PX-658	TetraHydroFurfuryl Oleate
PX-917	TriCresyl Phosphate

W&D 3953

PLASTICIZER DIVISION

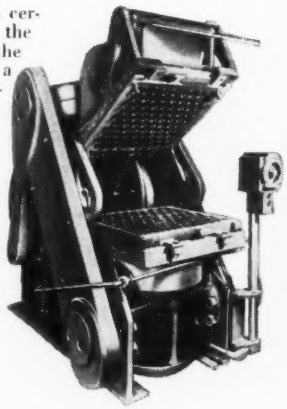
PITTSBURGH COKE & CHEMICAL CO.

Grant Building · Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Take six eggs and 1 lb. of butter.

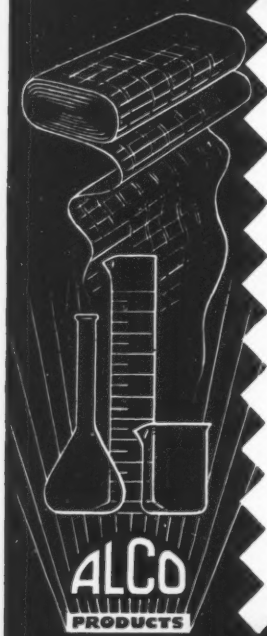
. . . and so on. Mrs. Beeton certainly knew how to mix the best things to produce the best results. We've made a study of the subject of mixing too . . . for the last 72 years in fact, which is no doubt why people with problems of breaking down, mixing or blending natural and synthetic rubbers, plastics and many other materials, have realized that the Shaw Intermix is their answer.



SHAW

Industry's headquarters for the best in Plastic & Rubber Machinery

FRANCIS SHAW & COMPANY LIMITED
MANCHESTER 11, ENGLAND



Do You Want to Compound Your Own GR-S, Natural, Neoprene or Buna N Latices?

VULCARITES

Compounding Dispersions of Rubber Chemicals, are now available for Latex Compounding

VULCARITES are supplied as individual dispersions of zinc oxide, sulfur, antioxidants and accelerators. Composite dispersions of these chemicals are also available.

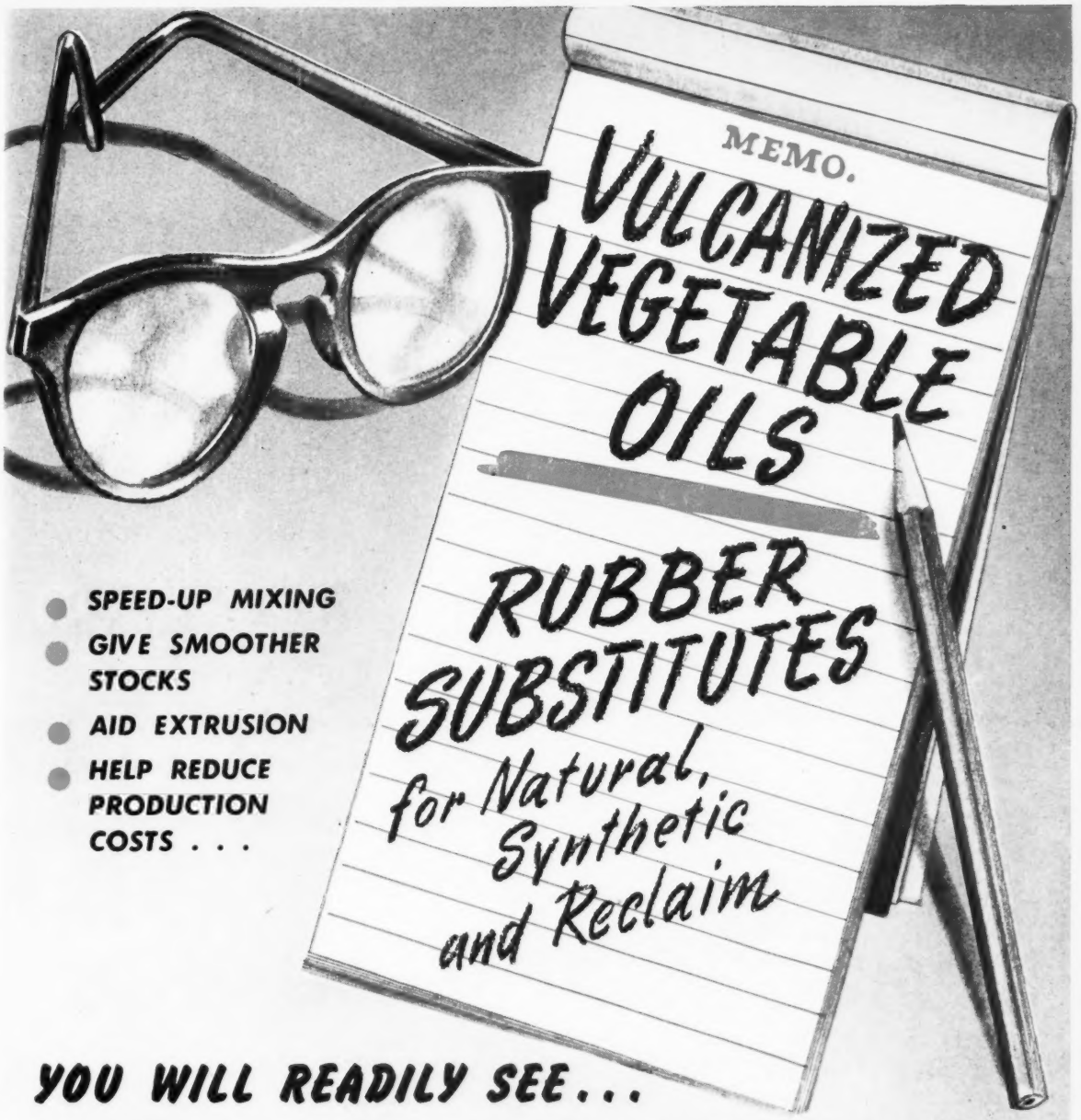
Inquiries on special dispersions formulated to your definite specifications are invited.

★ ★ ★

Samples and technical service available promptly on request.

ALCO OIL & CHEMICAL CORPORATION
TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

SOUTHERN DISTRIBUTORS
WICA COMPANY INC.
CHARLOTTE, N.C.



- **SPEED-UP MIXING**
- **GIVE SMOOTHER STOCKS**
- **AID EXTRUSION**
- **HELP REDUCE PRODUCTION COSTS . . .**

YOU WILL READILY SEE...

the values provided by VULCANIZED VEGETABLE OILS in your production program . . . They aid in processing compounds because they are completely compatible and are incorporated rapidly in mill or Banbury mixing . . . They produce a soft, smooth feel in the finished product. In heavily loaded GR-S stocks they give properties of "snap", flexibility and recovery which make them feel more like natural rubber.

These RUBBER SUBSTITUTES produce a mild softening effect, greatly aiding extrusion and giving better flow and better appearance to molded goods . . . And then, too, there is the saving to consider through their ability to replace part of the rubber hydrocarbon in a compound, thus extending the more costly rubbers without appreciably affecting the cured physical properties.

There are more ways to SAVE on production costs through the use of RUBBER SUBSTITUTES. Refer to our Technical Bulletin. Just write for it.

HARWICK STANDARD CHEMICAL CO.

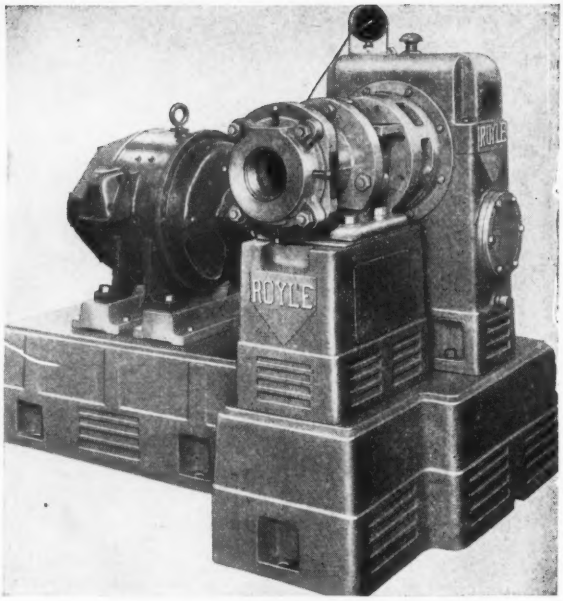
AKRON, OHIO

BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES

Designed To Extrude RUBBER or PLASTICS

IN these days of rapidly changing developments owners of Royle extruding machines are in the advantageous position of being able to adapt their extruders to either rubber or plastics production. If you are faced with the problem of extruding rubber and plastics the versatility of ROYLE extruders is of paramount importance to you. Whether you require a light or heavy production extruder features have been incorporated to assure maximum results. The change-over is quickly and simply accomplished.

Send for your copy of Bulletin No. 448. It describes these features and how they may be applied to older type extruders.



ROYLE # 2 Extruding Machine. Non-extended cylinder, plain tubing head.

JOHN ROYLE & SONS — ROYLE, PATERSON, N. J.

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN 1880

London, England — James Day (Machinery) Ltd. — REgent 2430

Home Office — J. W. VanRiper — SHerwood 2-8262

Akron, Ohio — J. C. Clinefelter — JEfferson 3264

Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

A ***MUST*** FOR EVERY COMPOUNDER OF RUBBER

1947—SECOND EDITION OF

COMPOUNDING INGREDIENTS FOR RUBBER

The new book presents information on nearly 2,000 separate products as compared to less than 500 in the first edition, with regard to their composition, properties, functions, and suppliers, as used in the present-day compounding of natural and synthetic rubbers. There is also included similar information on natural, synthetic, and reclaimed rubbers as the essential basic raw materials. The book consists of over 600 pages, cloth bound for permanence.

PRICE $5.00 POSTPAID IN U. S. A. $6.00 ELSEWHERE

(Add 3% Sales Tax in New York City)

INDIA

RUBBER WORLD

386 FOURTH AVENUE — NEW YORK 16, N. Y.

best buy for shoe soles

Tests prove you get more flexibility with PLIOLITE S-6 B

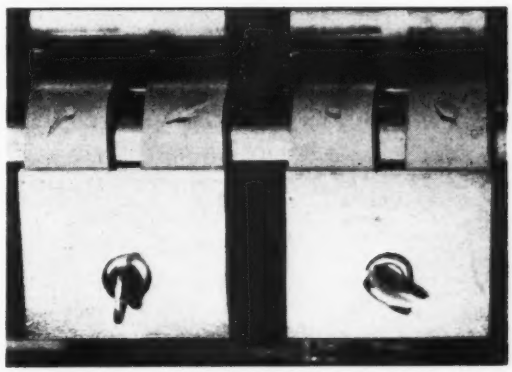
COMPARED with other resins available on the market, **Pliolite S-6 B** in shoe soles gave higher flexibility on the Ross Flex Test Machine, as shown in the inset photograph here. These pierced samples of soles made with Goodyear's new, truly easier processing resin showed markedly longer flex-life.

Shoe sole makers everywhere are turning to **Pliolite S-6 B** because of its ideal combination of qualities—lighter color, higher Shore hardness, low specific gravity, leathery "feel," and ready processability even under marginal Banbury or mill conditions.

This same combination of qualities makes this resin equally attractive to makers of flooring, molded and inflated rubber items, electrical insulation and a wide range of other products.

Why not see what **Pliolite S-6 B** offers you—by sending today for full details and samples for evaluation. Write:

Goodyear, Chemical Division, Akron 16, Ohio



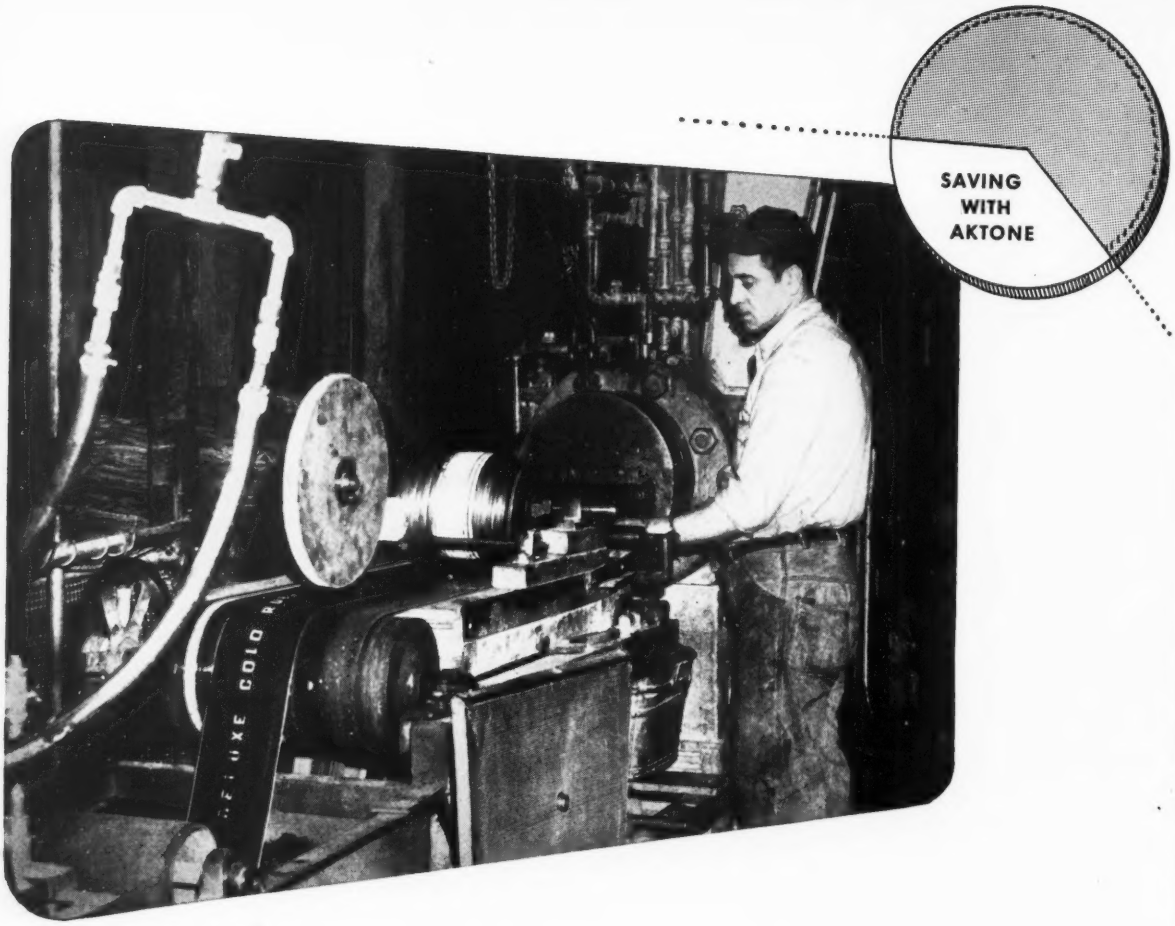
COMPETITIVE RESIN **PLIOLITE S-6 B SAMPLE**

Unretouched photograph illustrates cut-growth of pierced samples of shoe soles made with **PLIOLITE S-6 B**, on right, and a competitive resin, on left. Samples are in duplicate. Compounds differ only in the type of resin used. Note greater resistance to cracking exhibited by the **PLIOLITE S-6 B** sole at equivalent flexing.

USE PROVED Products

Pliolite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR



AKTONE in GR-S Camelback cuts accelerator costs

To cut your accelerator costs in GR-S Camelback, try this typical AKTONE-MBTS combination in your plant:

GR-S	100	Zinc Oxide	5
AROMEX (HAF) Black	50	Sulfur	1.75
Process Oil	10	MBTS	0.50-0.625

AKTONE 0.50-0.625

Cured at 300° F, this AKTONE-MBTS combination produces improved physical properties and less deterioration after long-time shelf-aging...with accelerator cost savings of as much as 40 percent.

Natural, GR-S, butadiene-acrylonitrile type rubbers all respond well to the use of AKTONE accelerator activator. It is being used on a variety of products—from rubber bands to tire treads—with accelerator cost savings of from 15 to 50 percent.

Write today for your copy of the AKTONE Bulletin: complete technical data on the use of AKTONE in all types of formulations. Samples on request.

J. M. HUBER CORPORATION · 100 PARK AVENUE · NEW YORK 17, N. Y.

HUBER

Manufacturers of

Channel Blacks
Furnace Blacks
Rubber Clays
Rubber Chemicals

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RUBBER WORLD
A Bill Brothers Publication

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VOL. 125—NO. 4 JANUARY, 1952

Recent Developments in Extrusion[1]

H. E. Buecken[2]

RECENT developments in the field of extrusion of rubber and plastics by the National Rubber Machinery Co. include a new line of single-screw, two-stage extruders, in which a certain amount of compounding together with devolatilization of liquids and gases of thermoplastics is accomplished before extrusion; a new flared head strainer feed screw, which, when incorporated in a machine known as the Mil-Strainer, is particularly applicable to reclaimed rubber processing; and, the Mil-X-Truder, a machine which permits the simultaneous mixing and extruding of many rubber stocks and eliminates the need of warm-up mills or lengthened Banbury mixing time when cold stored stock is being processed or when stock is being taken directly from the Banbury for extrusion.

The motivation behind the development of these new machines was the need of both the rubber and the plastics industries to reduce today's very high labor and handling costs. One of the best ways of accomplishing such reduction is by increased mechanization of process lines, and machines which will combine operations previously requiring two or more different machines in one and the same machine represent very great improvements in the right direction.

Devolatilizing, Compounding, and Extrusion of Thermoplastics

The need of improved methods of compounding such as can be obtained by means of continuous, single-screw type of extruding equipment has long been recognized by the thermoplastics industry. It should be possible by use of the NRM single-screw, two-stage extruders to make either profile extrusions or pellets, remove gases or water vapor liberated under some conditions at extrusion temperatures, and at the same time do sufficient compounding to permit the use of preblended powder mixes and obtain acceptable dispersion of colors.

The NRM two-stage extruder is a single-screw type of machine which incorporates two cylinder sections in line. (See Figure 1.) The rear section includes the water cooled feed opening, while the front cylinder section includes the devolatilizing chamber. Between rear and front sections is the torpedo-type valving arrangement which can be adjusted by axial movement of the screw, thus making possible the control of the flow of material between the two sections. The single screw, therefore, consists of two flighted sections separated by the valve-type torpedo.

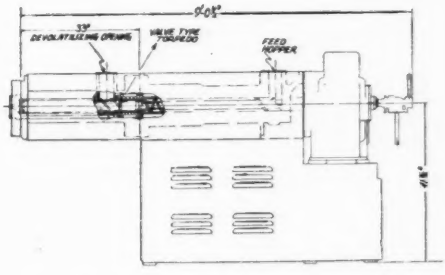

Fig. 1. Cross-Section of Single-Screw Type of Two-Stage Extruder—NRM Model No. 3540

Results to date with this machine have been very encouraging. We have compounded and extruded undried (wet) cellulose acetate and ethyl cellulose compounds in powder form, previously premixed by tumbling and undried (wet) acrylic resin (Plexiglas), and have produced rods and strips reasonably dry and free of bubbles or porosity for pelletizing. Also, quite satisfactory results have been obtained in dispersing color pigment in resin. In addition, we have conducted tests with certain vinyl compounds in powder form and have been able to extrude sections free from porosity, which is usually caused by volatile or entrapped gases.

NRM has built single-screw, oil and electrically heated, two-stage extruders in sizes ranging from Model 2530 to Model 8090 (2½- to 8-inch screw). (See Figures 2, 3, and 4.)

Improved Rubber Straining

A rather unique and recent NRM development is the flared head strainer feed screw used in conjunction with the standard pneumatically operated quick-opening flared strainer head, as shown in Figure 5.

The design of this new flared head strainer feed screw is a very great improvement over the straight type. Of

[1] Presented before Boston Rubber Group, Boston, Mass., Oct. 19, 1951.
[2] Manager, plastics machinery division, National Rubber Machinery Co., Akron, O.

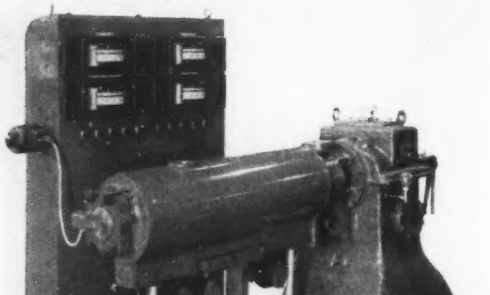

Fig. 2. Electrically Heated, Single-Screw Type, Two-Stage Extruder with Balanced Heat Control—NRM Model 2530-E

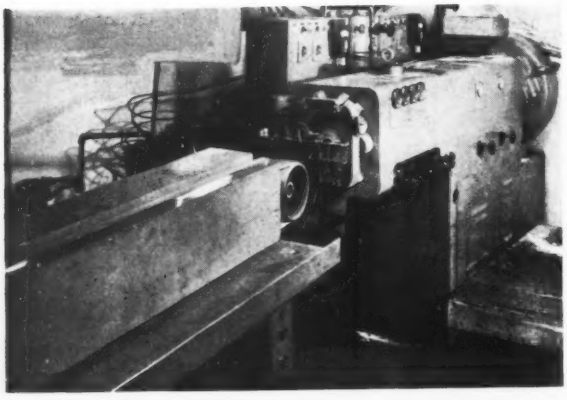

Fig. 3. Two-Stage, Single-Screw Type, Oil Heated Plastics Extruder, with Vacuum Arrangement, In Operation—NRM Model 3540-O

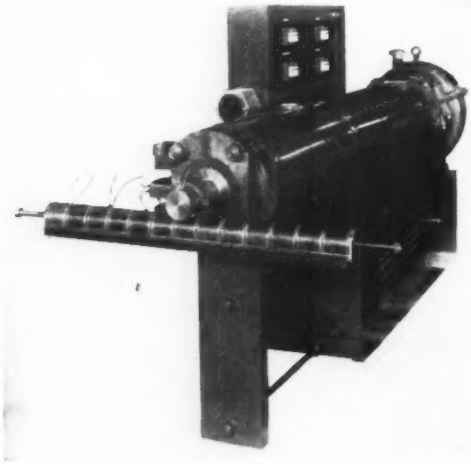

Fig. 4. Single-Screw Type, Two-Stage Plastics Extruder, Electrically Heated with Balanced Heat Control and Including 54-Inch Adjustable "T"-Type Film Die for Extrusion of Cellulose Acetate Film from an Undryed Premixed Powder—NRM Model No. 4550-E

the many obvious advantages obtained with this type screw, the increased straining capacity is perhaps the most important. As can be seen from an examination of the head end of this machine shown in Figure 6, the compound is now uniformly and positively forwarded and distributed over the whole strainer plate, and full advantage is taken of this large area.

At present time there are approximately six such installations successfully operating at plants of various rubber companies. Increased straining capacity of from 20-30% has been reported with only a slight increase in the horsepower required.

The Mil-Strainer

Another recent and perhaps more important NRM development is applicable to the field of reclaimed rubber processing and is the Mil-Strainer shown in Figures 7 and 8.

You will notice that the flared head screw has been adapted to the Mil-Strainer in order to take advantage of the improved performance obtained with this type of screw. The feed section of this machine, i.e., the feed hopper and the base cylinder with the exception of the liner, are typical standard strainer parts. The new and pertinent parts, however, are the cylinder extension, and, in particular, its liner and the base cylinder liner.

The extension cylinder liner, and in some cases the base cylinder liner, are provided with flutes having a negative helix angle for the purpose of reversing the flow of the compound as it is being forwarded by the feed screw. By this means a steady regurgitation and shearing of the material being processed is obtained. This type of processing, however, required so much additional heat, i.e., required the additional working of the stock, that when such processing was first tried on a standard strainer without the cylinder extension, the strainer capacity was reduced beyond an acceptable production level. The use of the cylinder extension was thus made mandatory.

The tendency of the extension to reverse the flow and hold the compound in the cylinder is controlled by the relation of the screw to the liner flutes. Under some conditions this relation can adversely influence the efficiency of the feed and the pressure on the strainer plate, but this situation can readily be corrected by the use of a positve fluted liner in the feed hopper section.

Depending on the application and the compound, different combinations of fluted liners may be advisable. A liner with positive flutes for forwarding the material through the cylinder might precede as well as follow the liner with negative flutes for mixing; or perhaps a short smooth liner between each fluted liner, to prevent interference between the action of the one-type liner with the other, might be advantageous. The use of the short smooth liner between the liner with the positive and the liner with the negative flutes would provide for some interruption of the large amount of work being done on the material.

The liners which are subjected to considerable wear cannot, at least at present, be lined with Xaloy like the conventional liner. To date they have been made of tool steel or other alloy steel and hardened. Also, we are making some of cast hard alloy.

Although the large amount of frictional heat developed when processing rubber in the Mil-Strainer is a limiting factor for a given size of machine; it can be readily controlled by the proper design of the liner flutes and screw and screw speeds.

For example, in one major rubber plant, a 8½-inch Mil-Strainer driven by a 125-h.p. motor processed 1,000 pounds of stock at a screw speed of 55 r.p.m. in 20

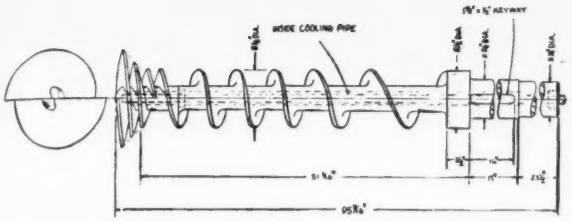

Fig. 5. Cross-Section of NRM Flared Head Strainer Feed Screw

minutes, starting with an empty machine. This is equivalent of 3,000 pounds an hour, compared to the 2,500 pounds an hour which may be processed with a standard (short) strainer. During the 20-minute period, however, the power requirements increased from 100 to 200 h.p., at which time the Mil-Strainer had to be stopped because the motor, gears, and bearings were dangerously overloaded. Lower screw speeds or shallow-er flights on the screw and liner will overcome this difficulty. Although such changes will lower somewhat the output of the Mil-Strainer, it is a comparatively small penalty to pay in order to bring the power requirements within the limits of the drive and the transmission.

The prime purpose and value of the Mil-Strainer is not only to strain the reclaimed rubber, which has been previously processed in the digester, and remove large particles of hardened rubber or other foreign substances, but also considerably to mix and work the reclaimed rubber stock. Because of the extensive mixing and working that can be obtained with the Mil-Strainer, we hope to be able to eliminate other types of mixing operation in current use following digester processing. We are also reasonably sure that the capacity of the roughing refiners, when supplied with stock from the Mil-Strainer, can be increased to such an extent that fewer refiners of this type will be required to supply stock to the usual number of finishing refiners.

NRM now has in operation and on order several 8½-inch and 12-inch Mil-Strainers.

It would appear, therefore, that with the use of the Mil-Strainer involving a small addition to the initial price of this-type equipment in the reclaiming plant and a negligible increase in the operating cost (power), several other pieces of equipment in the plant can be eliminated, thus reducing the amount of labor and time required to handle a given amount of stock and lowering production costs quite considerably.

The Mil-X-Truder for Cold Stocks

Another piece of equipment recently developed by NRM and felt to be just as important as the Mil-Strainer, is the Mil-X-Truder. (See Figure 9.)

The design of the Mil-X-Truder is, in principle, the same as that of the Mil-Strainer except that the flared strainer head is replaced with a standard die adapter head. A strainer plate located rather close to the flat face of the screw to increase back pressure and increase the amount of work done on the compound is definitely recommended in most cases.

Also, for all rubber applications, the cylinder extension is definitely recommended; in some applications other than rubber, the extension may be omitted on the Mil-X-Truder.

By use of the Mil-X-Truder, it is possible to extrude rubber compounds which have been stored at room temperature, feeding the stock directly into the machine at room temperature, and producing satisfactory extrusions at die temperatures in the neighborhood of 190-200° F.

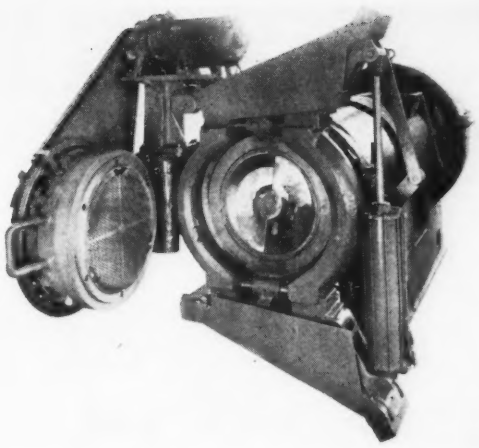

Fig. 6. NRM 8½-Inch Mil-Strainer Showing Full Diameter of the Flared Head of the Screw

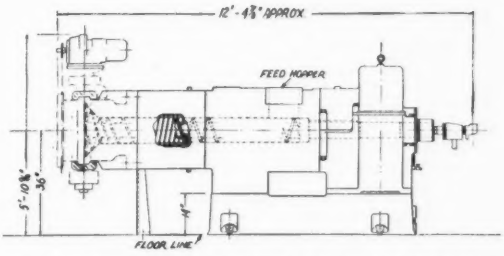

Fig. 7. Cross-Section of NRM 8½-Inch Mil-Strainer

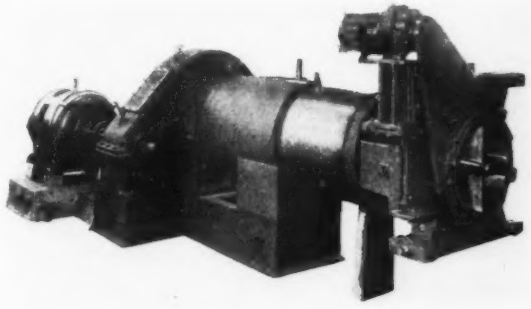

Fig. 8. Rear View of NRM 8½-Inch Mil-Strainer Showing Cylinder Extension

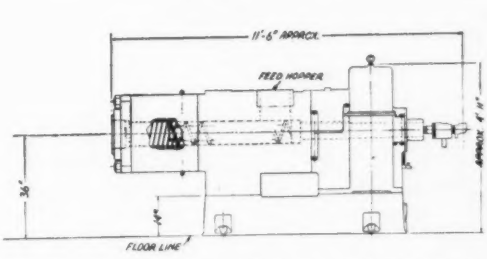

Fig. 9. Cross-Section of NRM 8-Inch Mil-X-Truder

The amount of friction heat developed by the stock in the Mil-X-Truder is again a limiting factor, but can be controlled by the same methods applied to the Mil-Strainer. The Mil-X-Truder is operated under the same conditions as a standard extruder except that at times

(*Continued on page 442*)

A Test for Crystallization Effects in Rubbers

J. R. Beatty[1]

THE stiffening of rubber-like materials at low temperature involves several different phenomena, sometimes with their effects superimposed. Methods of measuring the instantaneous effects of low temperature have already been described by several investigators.[2] In addition there are the effects of time,[3] stress,[4] and combinations of time and stress[5] at low temperatures which have been ascribed to crystallization. Comparison of diffraction patterns and elasticity measurements indicated that a dynamic modulus test provided a much more sensitive measurement of the changes which were taking place in the rubber than the diffraction patterns.[5]

This dynamic modulus test, however, involved a complex sample which was difficult to make; so it seemed desirable to develop a test which would be equally sensitive to small increases in crystallization, use a specimen from a standard tensile sheet, and utilize either existing or easily constructed equipment.

Testing Equipment and Method

Various means of testing including tensile modulus and retraction tests were studied. Both of these methods of test have the advantage that only short times are necessary for a considerable degree of crystallization to take place as stress, which is easily imposed in these tests, accelerates crystallization due to low temperature.

The retraction tests were found to have a number of disadvantages. Chief of these was the low order of discrimination between stocks which had previously been tested by other means of crystallization[5] and found to have large differences in crystallinity. This condition is probably due to lack of separation of second-order transition effects from crystallization phenomena. X-ray diagrams show considerable crystallization takes place in easily crystallizable rubbers at even moderate elongations on cooling to —70° C., even when this cooling is accomplished very rapidly. The separation of stiffening effects due to second-order transition and crystallization are therefore difficult because of this situation.

The tension test finally adopted operates with a constant load of 100 psi. on the original cross-section of a standard ASTM dumbbell to accelerate crystallization, with the modulus determined by the measurement of the additional deformation when a load of 20 psi. is added. This measurement is made at zero time, and at suitable intervals thereafter, with the zero time being that time at which the sample has attained equilibrium test temperature. Deflections may be measured conveniently by use of a cathetometer. In early work, however, a 1/100-inch graduated rule was found to be satisfactory. Figure 1 is a diagram of a typical arrangement for a top opening cold box. This test, however, may be conducted in any type of cold box with as many test stations as desired.

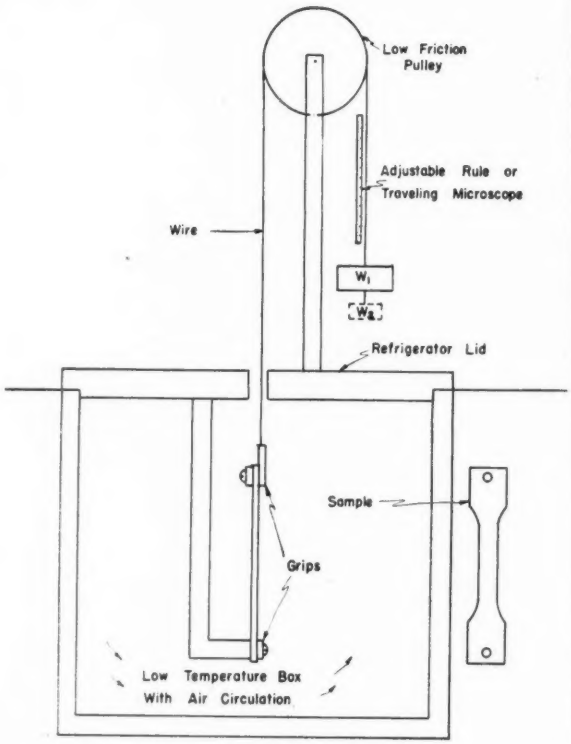

Fig. 1. Schematic Diagram of New Crystallization Tester for Rubber-Like Materials

The samples are first stressed to 120 psi. for five minutes to remove early creep and then cooled unstressed to the desired test temperature which may be chosen to approximate service conditions or for optimum crystallization under stress.[5] When equilibrium temperature has been established in the sample, the 100 psi. load is imposed, and the deflection is read at 15 seconds after loading. The time of 15 seconds between loading and measurement of deflection is used throughout the test. The additional deflection due to the 20 psi. load is then measured, and this load removed. This measurement is the zero time deflection. The deflection due to the 20 psi. load indicates the modulus, as modulus is proportional to the reciprocal of deflection where the force/unit area is constant and,

$$\text{modulus} = \frac{\text{force/unit area}}{\text{deflection/unit length}}.$$

Successive readings of the deflection resulting from the

[1] B. F. Goodrich Research Center, Brecksville, O.
[2] H. E. Greene, D. L. Loughborough, *J. Applied Phys.*, 16, 1, 3 (1945). J. W. Liska, *Ind. Eng. Chem.*, 36, 40 (1944). S. D. Gehman, D. E. Woodford, C. S. Wilkinson, Jr., *Ibid.*, 39, 1108 (1947).
[3] H. W. Moll, W. J. Le Fevre, *Ibid.*, 40, 2172 (1948). R. E. Morris, R. R. James, E. R. Evans, India RUBBER WORLD, 110, 529 (1944).
[4] L. A. Wood, "Advances in Colloid Sciences." Vol. II. Interscience Publishers, Inc., New York (1946).
[4] J. R. Katz, *Naturwiss.*, 13, 410 (1925).
[5] J. R. Beatty, J. M. Davies, *J. Applied Phys.*, 20, 6, 533 (1949).

addition of the 20 psi. load are made at suitable intervals of time until the test is judged complete. It has been found that 24 hours was sufficient time for rating the crystallization properties of rubber-like samples.

The data are reported in terms of crystallization resistance index or abbreviated "CRI," where "CRI" is given by 100 x d_t/d_o, where d_t is the deflection at time, t, and d_o the deflection at zero time due to the addition of the 20 psi. load. These data are then plotted as a function of time, and from the smooth curve thus obtained the

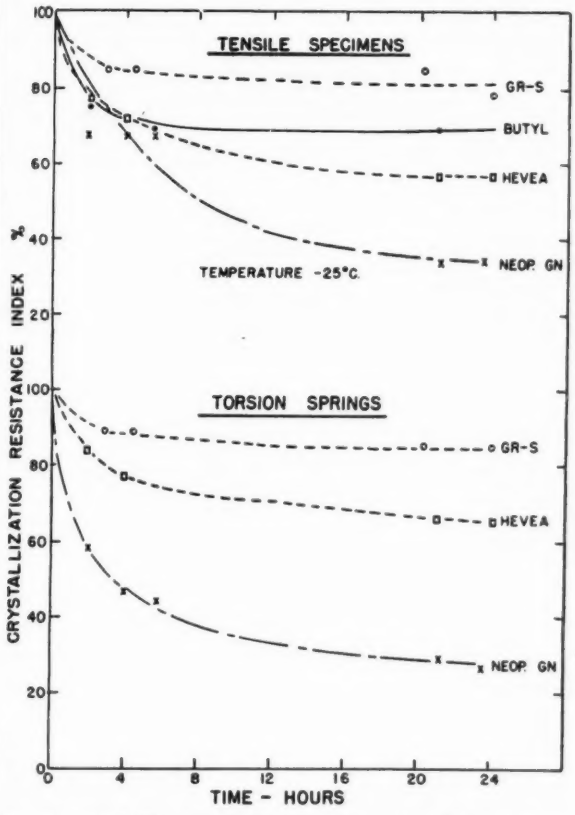

Fig. 2. Crystallization Resistance Index *versus* Time for Four Polymers at 25° C.; Results from Both Tensile Specimens and Torsion Spring Samples

24-hour value is read. The "CRI" value at 24 hours is the usual reported value because of convenience.

A high value of "CRI" naturally indicates a stock having little tendency to crystallize as the deflection due to the 20 psi. load has changed little, showing that the reinforcing effect of crystals is at a minimum.

Typical Results

Table 1 gives the crystallization resistance index for four polymers of recipes given in Table 2 after 24 hours at —25° C. determined on tensile samples and torsion springs at approximately the same average stress.

Comparison of "CRI" values obtained on tensile specimens is made with torsion spring results as an extensive study of crystallization phenomena has been made with this sample,[5] and correlation with X-ray diffraction patterns showed these dynamic elasticity measurements to be a sensitive measure of the changes taking place in the rubber due to crystallization. The springs are difficult to make and test; this difficulty thus led to the development of the static tensile test described.

TABLE 1. CRYSTALLIZATION RESISTANCE INDEX AT 24 HOURS OF POLYMERS TESTED

Polymer	Tensile "CRI" %	Torsion Spring "CRI" %
GR-S	81	85
Butyl	69	
Hevea	57	6[illegible]
Neoprene GN	34	28

TABLE 2. RECIPES

	GR-S	Butyl	*Hevea*	Neoprene GN
Polymer	100.0	100.0	100.0	100.0
Zinc oxide	5.0	5.0	5.0	5.0
Fatty acid	3.0	[illegible]	3.0	[illegible]
FT carbon black	20.0	20.0	20.0	20.0
Santocure	1.3	[illegible]	[illegible]	[illegible]
TMTD	[illegible]	1.0	[illegible]	[illegible]
Altax	[illegible]	0.5	[illegible]	[illegible]
MBT	[illegible]	[illegible]	0.6	[illegible]
Magnesium oxide	[illegible]	[illegible]	[illegible]	4.0
Sulfur	2.0	2.0	3.0	[illegible]
Age resister	[illegible]	[illegible]	1.0	[illegible]

The "CRI" of the tensile samples is computed as described earlier; while the "CRI" of the torsion spring samples is the reciprocal of the ratio of the dynamic spring rate (average dynamic modulus of the rubber) at time, t, to the dynamic spring rate at zero time. The dynamic spring rates of the torsion spring samples are determined from free vibration measurements. Butyl rubber is not evaluated by the torsion spring test as the damping was almost critical for this rubber compound. Figure 2 is a plot of the data secured by the two methods, which agree reasonably well.

Summary and Conclusions

A test has been developed for measuring the stiffening of rubber-like materials at low temperature due to crystallization. These measurements are easily performed in existing cold boxes and use any simple tensile specimen. Typical measurements and results of four polymers are shown.

Developments in Extrusion

(*Continued from page 437*)

heat may have to be applied at the feed hopper section and possibly at the base cylinder.

The advantages of being able to feed cold stock directly into the extruder are the elimination of the need of warmup mills when previously compounded and stored stock is being processed, and the ability to compound in one part of a plant and extrude in another. When stock is stored for future processing in the Mil-X-Truder, it may be preferable to take the compound off the sheeting mill in strips and store it in rolls for easier handling at the Mil-X-Truder.

Another desirable way to store compounded stock for future processing in the Mil-X-Truder is in the form of pellets. The preferred shape of the pellets would be a cube; however, small cylinders approximately ⅜-inch in diameter by ½- to ⅝-inch long, such as may be obtained from the Hale pelletizer, serve their purpose very well.

One major rubber company is preparing its compounds in the form of such pellets and transporting them by air conveyor from the compound room of its tire plant to the extrusion room of its mechanical goods plant.

Even where compounding and processing are more or less continuous, a warmup mill is generally used, or Banbury time must be increased in order to obtain the

(*Concluded on page 442*)

Selected Rubber References for the Mechanical Engineer, July, 1950 — June, 1951[1]

R. E. Shrader[2] and R. M. Turner[2]

THE purpose of this paper is to present an outline of rubber articles published during the past year which would be of interest to mechanical engineers. Those which are believed to be of special interest to the engineer are discussed in some detail; while those dealing with research on elastomers and compounding studies have been purposely omitted. The references have been divided into arbitrary groups in order to present a more interesting discussion.

Few people outside the rubber industry realize either the current growth of the industry or its demand on technical personnel. The rubber industry is big business, and it is getting bigger faster than the general economy of the United States. In 1939 the total consumption of new rubber was 593,750 long tons; whereas in 1951 it is expected to exceed 1,250,000 long tons. Furthermore, in 1939 only 2% of the rubber used was synthetic; whereas in 1951 approximately 60% of the elastomer requirements are being met with synthetic rubber. The value of rubber products made in 1951 is expected to exceed five billion dollars.

Processing and Manufacturing

With the increased use of rubber, there has been an increased interest both in methods of reclaiming rubber and in methods of producing synthetic rubber.

A new mechanical process for obtaining high-quality reclaim has been announced (1).[3] It is the Banbury-Lancaster method and is built around a newly designed Banbury rubber reclaimer and devulcanizer. With this apparatus it is reported possible to reclaim completely cured, partially cured, or scorched stocks and uncured trimmings either separately or together in one simple operation.

An interesting flow sheet of a rubber reclaiming process was presented in *Rubber Age* (2). Cracking rolls, screens, and magnets are used to remove metal parts and reduce the scrap to a 3/8-inch sheet. Those interested in reclaiming should find this article very useful.

Chubb, Taylor, and Feustel have developed a new process of deresinating guayule (3). They expressed the thought that their process would yield a domestic source of rubber should our supply of *Hevea* be lost.

A method has been announced to produce cellular rubber from latex in which blowing agents and surface active agents are incorporated in the latex, and expansion occurs in the mold after heating (4). This method is contrary to the usual practice in which a froth is produced by beating air into heat-sensitized latex and gelling before heating. The new technique is said to produce products having more spherical and regularly disposed openings and a higher density at the surface than in the center.

An interesting article on manufacturing rubber footwear has been published which presents the problems and complexities of this business from the manufacturer's viewpoint (5).

Engineers designing polymerization equipment will find of interest an article by Hobson which discusses the importance of eliminating oxygen from the GR-S polymerization system (6).

Ultrasonic vibration to accelerate polymerization is being tested (7), and radio-frequency has shown new merit with respect to vulcanization of rubber (8).

New Applications

Cavitation and erosion have caused such severe pitting and loss of metal on ship appendages that methods of coating these areas are continually being tried (9). Durthe last war a technique was developed by the Navy for covering metal with a molten spray of a synthetic rubber. This coating is especially effective in salt water exposure. The equipment used resembles a welding torch into which is fed a powdered form of synthetic rubber. The powder, when contacting the flame, becomes a liquid, and it fuses to the steel member being coated. The whole operation is costly because of the careful preparation that must be given the surface, the skilled labor needed to operate the spray gun, and the loss of 40 to 50% of the material when it passes through the flame. Recent improvements both in the spray material and the methods of application should widen the utility of this process and make it practical for many industrial uses (10).

Experiments have been successfully carried out with glass fiber reinforcement in foam rubber (11). Bennett, McFadden, and Lyman have found that adding glass fibers in the preparation of the foam rubber results in a marked improvement in physical properties. Vulcanized foam rubber which has been reinforced in this manner shows greatly reduced shrinkage during curing and drying, increased resistance to compression, and increased tensile strength.

Goodloe (12) reports that wood cellulose as a filler in rubber compositions reduces shrinkage and kills nerve. These two properties have frequently restricted the development of elastomeric articles requiring close dimensional tolerance.

The use of phenolics in many products has been limited because of insufficient impact strength. This deficiency can be overcome by the addition of synthetic rubber to the phenolic material. Goss (13) reports some of the physical characteristics of rubber-phenolic mixtures and indicates some of the possible applications of such combinations.

[1] Presented before the Rubber & Plastics Division, ASME, Atlantic City, N. J., Nov. 27, 1951. Contribution No. 89, Rubber Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

[2] Du Pont rubber laboratory.

[3] Numbers in parenthesis refer to similarly numbered references in Bibliography at end of paper.

The use of rubber powder in paving highways is increasing, and experimentation is continuing (14-17). Gunther (14) has found that a tire tread-type compound in the form of a fine powder, when added in the amount of 10%, produces the most satisfactory paving.

A new-type spray gun has been announced which is said to spray polymeric emulsions without the usual clogging and cobwebbing (18). This spray gun ejects water vapor, air, and the emulsion simultaneously out of three different nozzles, and Nielson and Leonard believe it will be of great help in the spraying field.

Equipment

The advances made in equipment are, as would be expected, not so numerous as those in the fields of research and application. There have been several articles published, however, in relation to plant design and equipment which should be of interest to the engineer.

There are, no doubt, many instances where the designer of a small plant cannot afford to spend the necessary time in making an accurate cost study before selecting his power distribution system. An article has been presented in which an engineering study was made of the power distribution system in a small rubber plant. This study indicates that the selection of the proper voltage is an essential step in achieving a low-cost flexible system (19).

One of the most important steps in the processing of rubber articles is that of vulcanization. Temperature, pressure, and time must be all carefully controlled to achieve the maximum efficiency in this process. Industrial controllers are contributing in a large measure toward maintaining these variables within the required limits (20-21). Types and sizes of hydraulic presses used in the vulcanization process have been reviewed (22). These presses have capacities as high as 5,000 tons. Work has been done showing that it is possible to construct molds having suitable electrical insulation for radio-frequency heating (8).

From a safety standpoint, much of the equipment used in the rubber industry, such as open-roll mills, calenders, crackers, and refiners, presents serious operating hazards. Although this subject is not new, there has recently been renewed interest in the safety codes of rubber equipment, and an interesting article has been presented on the instantaneous braking of such equipment (23).

The design engineer, who has frequently requested fundamental physical properties of rubber parts under high-speed service conditions, will be interested in a new high-speed tensile testing machine. (24). This machine is capable of recording the stress-strain curve of rubber at rates of elongation 9,000 times as fast as that employed in conventional rubber testing.

The elastic properties of polymers and plasticized rubber compounds, which are too soft to test on a conventional stress-strain machine, have now been measured by a constant stress method of elongation (25). The constant stress is obtained by employing a specially designed tension weight suspended from the specimen. As the film stretches, the weight is lowered into a liquid, and buoyancy reduces the load in proportion to the decrease in cross-sectional area of the test specimen. The change in strain with time is measured. This method is reported to be particularly useful for characterizing unvulcanized polymers and for evaluating plasticizers in uncured compounds.

Better correlation between a laboratory test and tire performance than previously possible with conventional methods of testing has been reported (26). This laboratory test, performed on an inclined plane tester, subjects the rubber specimens to low tensile stresses and is rapid and reproducible.

Hysteresis measurements over a wide range of elongations and amplitudes have been reported by Mooney and Black (27). These measurements have been made with a spider hysterometer.

Testing and Properties

In the field of testing it is recognized that the desirable end result is to develop a test that will give a true indication of service life. It is with this thought in mind that testing as such must be viewed very critically to be sure that the test reflects service conditions.

Winkelmann states that the weather resistance of elastomeric vulcanizates is influenced markedly by their treatment prior to vulcanization (28). He has observed that strains not released before or during vulcanization result in poor weather resistance. Extruded stocks show less checking or cracking than molded articles.

Wahl reviews the various types of abrasion testers and points out the importance of selecting the one which most nearly approaches the service application (29).

The mechanism of flex cracking is not clearly understood; yet it is the cause of failure of many rubber articles. Buist and Williams (30) discuss the flexing testers now in use in the rubber industry and briefly review all the work that has been done on this subject. They point out the gaps in this field and cite the need of additional work.

The development of methods of evaluating tear resistance is still an active problem in the rubber industry. ASTM, in 1948, adopted the angle tear specimen (Graves) as an alternate to the crescent specimen which has been used for a number of years to evaluate tear resistance of rubber. The fundamental difference is that the Graves specimen measures the force required to initiate tear, and the crescent specimen measures the force required to continue tear. There is still considerable controversy between advocates of these two methods of evaluating tear resistance (31).

The tests required on many rubber mountings are of a load deflection type. If the load on a rubber product is maintained, deflection will increase with time, and the extent of this deflection is known as creep or drift. Cooper presents formulae and graphs, which are of value to design engineers, for predicting this property of a rubber product (32).

Enabnit and Gehman have found that by the use of certain types of tests the dynamic properties of a vulcanized compound can be fairly well anticipated in the raw polymers (33). These properties can be measured by using low amplitude shear vibrations at 60 cycles per second so that effects due to plastic flow in the raw polymers are suppressed, and the values of dynamic modulus and resilience are independent of plasticity.

It has been reported that there is still no satisfactory and discriminating test available for evaluating rubber-to-metal bonding agents. Buist has presented data in the past year which show the importance of the volume of rubber rather than the shape factor in a test unit (34). This work should lead to a better method of testing of rubber-to-metal bonding agents, since it offers a clearer picture of the facts underlying the design of rubber-metal spring units.

The application engineer will be interested to know that an accelerated aging test has shown excellent correlation with service performance on neoprene jacketed cables (35). Vacca's performance test covers a period of nine years, and, as a result of the excellent correlation with accelerated aging tests, it is apparent that the service

life of more than 20 years can confidently be expected from these neoprene jacketed cables.

Because of the increased demand for rubber compounds to function at extreme low temperatures, the importance of low temperature testing has increased. Those interested in low temperature testing will find "Low Temperature Testing of Elastomers" well worth reading (36). This article defines and discusses crystallization, plasticizer-time effects, and second-order transition.

Shaw (37) states that some rubber procurement specifications are inadequate in specifying the proper test methods for obtaining articles that will operate satisfactorily under arctic conditions. This article recommends test methods for specific applications and classifies them according to the physical properties they measure.

Riesing presents a very interesting review of engineering design with rubber and a description of 15 important elastic polymers. Temperature and hysteresis effects in all types are shown, and methods of calculating designs of special shapes are furnished (38).

Van Rossem presents a review (39) of natural rubber and its properties as a raw material for the manufacturing industry. He discusses general requirements for rubber manufacturers, possible new methods of preparation, and the future of natural rubber.

Liska states that skilled rubber technologists are in a very favorable position today to assist the engineer in selecting rubber materials for specific applications. Of course, final acceptance of a product must be based on service testing. A review of six automotive rubber products and how the rubber technologist might approach them are outlined in the paper, which also includes a chart of the basic qualities of natural and certain synthetic rubbers (40).

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Developments in Extrusion

(Concluded from page 439)

required mixing and softening of a compound prior to feeding it to the extruder for slabbing, or to a screw-type pelletizer. It is NRM's hope to eliminate the warmup mill or the extra Banbury mixing time by feeding direct from the Banbury to the Mil-X-Truder and thus extrude slabs, strips, or even pellets with considerable time and labor saving when compared to conventional processing.

The Mil-X-Truder is having wide acceptance in the mechanical goods field where savings can be realized by the elimination of the warmup mills before extruding. Also, in our opinion, this machine could be used in the room temperature extrusion of rubber on wire, as licensed by Western Electric Co.

NRM has installed or has on order Mil-X-Truders ranging in sizes from 2½ to 8½ inches. Output from these machines is reported as almost as good as that from standard extruders, while horsepower requirements are 15 to 20% higher than with the standard model.

Summary and Conclusions

In conclusion, it can be stated that NRM is confident that the single-screw, two-stage extruder, the Mil-X-Truder as well as the Mil-Strainer, including the flared head screw, are important new machine developments that will revolutionize the compounding and extruding field for the rubber and the plastics industries.

"Operating Suggestions for Molding Lustrex Styrene Plastic." Production Information Bulletin No. 68. Monsanto Chemical Co., Springfield, Mass. 16 pages. Conservation of styrene molding powder is the theme of this bulletin, which presents information and a conservation check list for molders and extruders. Topics covered include material section, mold and product design, fillers, material storage and handling, scheduling and plannng runs, molding techniques, degating, post-molding operations, scrap segregation and recovery, and employe education.

Editorials

1952—A Year of Decision

AS WE look back at the year 1951 and then forward at 1952, it is apparent that the former was marked by exceptional industrial progress in the United States, and that the latter will require that important decisions be made so as to permit this progress to continue.

In the rubber industry particularly, progress was all the more remarkable because it was made under the most severe governmental restrictions in the peacetime history of the industry. The government continued its ownership of the synthetic rubber producing plants; it procured the synthetic rubber raw materials and scheduled the production; it was the only buyer and importer of crude natural rubber; it determined the amount of rubber that was consumed by manufacturers; it set the specifications for the use of new rubber; and it determined the price.

Nevertheless the industry consumed 1,235,000 long tons of new rubber in 1951, only slightly less than the 1,258,000 tons consumed in 1950. Unit production was less than in 1950, but the value of the products, owing to rising costs and prices, set a record value of $5 billion.

The spectacular rise in the price of natural rubber during the last half of 1950, which continued through most of the first half of 1951, slowed down natural rubber stockpiling and resulted in reactivation of the nation's synthetic rubber plants. In addition, within plant, expansions were implemented which will add 100,000 tons GR-S capacity early in 1952 so that production at an annual rate of 860,000 tons will be possible.

The year 1951 saw the growing acceptance of cold GR-S rubber, and in 1952, 75%, or 640,000 of the 860,000 tons total GR-S production, will be of this type. Oil-extended synthetic rubbers were shown to have great value in increasing the nation's total supply of rubber, and they also provide a high-quality material that is easier to process.

The natural rubber stockpile goal is now in sight, and synthetic rubbers are firmly established in the United States market. New rubber legislation, which must again be considered in 1951, should be written in the light of these new facts. Because of the Korean war and the defense program, however, one outlook is for a simple extension of the present Rubber Act for one year. Barring all-out war in 1952, there will be the most opportune time for the working out of a real synthetic plant disposal plan and the removal of practically all of the remaining controls on the rubber industry in that year.

If the achievements of the year 1951 and previous years are to mean anything to the future of the rubber industry, some very important decisions must be made by government and the industry in 1952. For almost ten years the government has controlled the rubber industry, and the time has come for the removal of control of industry operations by Washington.

In the field of the production of GR-S and butyl synthetic rubbers, the government must eliminate itself completely before private industry operations can begin. Synthetic rubber production by private industry requires an ample supply of synthetic rubber raw materials, and this can be accomplished best if the production of butadiene, styrene, or other monomers is a part of the whole operation. A company entering into the production of synthetic rubber should therefore include in its plans facilities for the manufacture of petrochemicals. Some rubber companies have already made such plans. The increasing interest of rubber industry firms in plastic materials has given added emphasis to the need of the development of chemical and petrochemical manufacturing facilities.

National security considerations have always been the stumbling block to action by the government on disposal of its synthetic rubber plants. These considerations always were based on an insufficient natural rubber stockpile and an uncertainity as to the degree of security provided by synthetic rubber. With the natural rubber stockpile goal now in sight, and American synthetic rubber providing almost a complete replacement for natural rubber, major obstacles to plant disposal have been removed.

One way to insure a decision by government on this issue would be for Congress to set a deadline for the termination of production of synthetic rubber by the Reconstruction Finance Corp. dated 12 months from June 30, 1952, the date of the expiration of the present Rubber Act. A plan for the disposal of the government plants would then have to be worked out in advance of July 1, 1953, and a plan for their operation by private industry would also have to be ready by that time if the industry wished to continue to use synthetic rubber. Since private industry has operated these plants from the beginning, the mechanics of transfer would be a simple matter. The major change would be the elimination of the central administration from the Synthetic Rubber Division, RFC, in Washington, D. C.

The stage is set; all that is needed is for the curtain to rise, and a new era of the American synthetic rubber industry can begin. India RUBBER WORLD hopes that curtain time will not be later than 1953.

R. G. Seaman

DEPARTMENT OF
PLASTICS TECHNOLOGY

Selected Plastics Literature References for the Mechanical Engineer, July, 1950-June, 1951[1]

Gordon B. Thayer[2]

THIS paper is a brief review of plastics literature references which have been selected to be of interest to the mechanical engineer. While the list is short, many of the articles are themselves reviews and contain extensive bibliographies. The references are classified into 12 groups corresponding to the divisions in the text, in which some of the references are further described.

New Materials

The synthetic resins which have appeared in the past four or five years are finding wider application. Their military uses are not generally discussed in current literature (1-5), but it is expected that these resins will experience accelerated development because of military needs.

Chemical, Thermal, and Permanence Properties of Plastics

Several articles (6-12) are listed as typical of the interest in the retention of physical properties under various conditions of use. The ever-widening range of applications of plastic materials demands more and more information concerning their behavior at other than room temperature and in the presence of various chemicals.

Mechanical Properties of Plastics

Many interesting articles dealing with the mechanical properties of various plastics are compiled in groupings according to their subject matter (13-28). The articles of general interest are listed first and are followed by those of more specific interest.

An item of general interest to mechanical engineers concerns the general properties of plastics materials (13). Impact tests are discussed in a survey of sources of variations in impact strength results (14). A new summary of chlorotrifluoroethylene plastic properties (27) is of interest for augmenting existing information.

Textile Fibers and Finishes

It is recommended that the mechanical engineer examine the articles listed as pertaining to textile fibers (29-37), inasmuch as several of the references describe some of the new fibers which are becoming more available (29-33).

Paper Laminates and Reinforced Plastics

Laminated paper plastics continue to be used more and more widely (38-50). One article discusses decorative laminates in a survey of the field (38), while another describes the use of laminated materials for freight car bodies (40). Both wood and paper laminates are employed for this latter purpose.

The use of polyester resins laminated with glass fibers or reinforced with glass fibers is discussed in a number of articles. Methods of fabrication are discussed at considerable length in one survey article published in three parts (42).

The use of glass fibers with polystyrene molding compounds has received little or no description in the literature. This is a rather new development, and a very little background of reliable information appears to be available.

Protective Coatings

Silicone finishes for baked enamels for sheet metal protection are discussed in an interesting story (53). Paints for domestic use in decorating and protecting are discussed in two other articles (51, 55).

Coating and Calendering Equipment

Two articles describe calendering equipment and auxiliaries (57, 58); while another describes a coating method for extrusion deposition of polyethylene on paper (61).

A double-screw compounding mixer is described in an article (59) which is of interest because the machine has been put to work in production of colored formulations by several thermoplastic material manufacturers.

Plastic Molds and Molding

Several articles describe new mold making ideas (62-65); while one reference discusses a method of using fluid heating and cooling for molds and calender rolls (66). A series of articles on successful designing for plastics molding appeared in a British journal (65). From this same journal there is also an article on a special mold for producing interrupted internal stripping or unscrewing (64).

Molding the specialized plastics such as silicones, trifluorochloroethylene, mineral-filled alkyds, and melamine resins is described in an article written by several experienced men (67). Slush molding of vinyl plastisols and the latest developments of this expanding field are discussed (68). The rapid expansion of this field can be traced to improvements in the plastisol resins, as well as in the molds and molding technique.

Vinyl Film and Sheeting

Embossing of vinyl film, as it comes from the calender, has produced new design pattern effects. This has been brought about by the use of the Dornbusch system of engraving the embossing rolls (72).

Solution-cast film is the subject of an article (75) which tells of the properties of such film. Of interest to packaging people is an article on the permeability of polymeric films to gases (71).

Injection Molding

A motion picture study of the injection molding cycle is described in one article (76), and several conclusions are drawn as to practical and theoretical considerations.

An excellent description of the injection molding of phonograph records is listed (77), and the latest advances in dry coloring are described (80). Both of these subjects are of interest to plastics molders and to engineers charged with the responsibility of economical molding of high-quality articles.

Extrusion

The technology of extruding polyethylene monofilaments is discussed in one article (83), and two articles on extrusion compounding are also listed (81, 82).

Plastic Material Applications

Many articles on the uses of plastic materials have been scanned and considered for inclusion in this review. Only a few have been included (84-117), and these have been selected from the standpoint of general interest as well as certain specific interests that may be aroused from the significant advances described in the articles.

The use of polystyrene injection molded patterns for the lost wax casting of nonmachinable metals has been growing during the past year (113). Fabrication of the fluorocarbons has also advanced considerably (109). Plastics have been used extensively as ion exchange resins (106, 107). Molded nylon gears have gained extensive usage in certain applications (100, 101).

Phenolic resins have been used to strengthen foundry sand for dry sand

[1]Presented before the Rubber & Plastics Division, American Society of Mechanical Engineers, Atlantic City, N. J., Nov. 26, 1951.

[2]Plastics technical service, Dow Chemical Co., Midland, Mich.

molds (114) and have also been used to reclaim sawdust (115). Foams of various plastic materials are becoming more important. One article reviews five different types of foams (99). Application trends and engineering progress during 1950 are reviewed in several articles that are of considerable interest (85-88, 95, 102).

A-low temperature formulation of polyvinyl chloride is described for temperatures of —100° F. (104) The use of plastics in radio-active measurements is described (108). Several application articles cover plastic gaskets (89, 94, 109, 110).

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SPI Vinyl Film and Sheeting Conference

THE third annual conference of the Plastics Film, Sheeting, and Coated Fabrics Division, The Society of the Plastics Industry, Inc., was held December 13-14 at the Commodore Hotel, New York, N. Y. A total registration of 453 persons was recorded at the two-day meeting, which included luncheons and both morning and afternoon sessions at which papers were presented on technical and merchandising subjects.

Thursday Morning, December 13

H. R. Thies, Goodyear Tire & Rubber Co., presided over the morning session at which the following papers were given:

"A Study of Plasticizer Migration." C. M. Grafton and J. R. Geenty, Goodall-Sanford, Inc. A plasticizer migration test was described that is simple to perform, accurate, practical, gives reproducible results, and can be used on film, sheeting, or coating stripped from fabric. In essence, this test consists of immersing weighed samples of plasticized vinyl in a special silica powder under controlled conditions. The powder is changed at intervals, and the samples are weighed to determine plasticizer loss. Comparative migration data were given for various plasticizers, and it was shown that polymeric plasticizers are not necessarily non-migrating.

"Vinyl Film, Sheeting and Coated Fabrics in the Automobile Industry." A. J. Carter, Chrysler Corp. The history and growth of vinyl film, sheeting, and coated fabrics in the automobile industry were discussed, together with the advantages of these materials. The disadvantages of vinyl coated fabrics for trim materials include a tendency to have a tacky surface condition; a tendency to crack in the cold if the surface is too dry; and difficulty in cutting and trimming by conventional methods. Further expansion in use of the vinyls by the automobile industry was predicted, and a forecast made that vinyl coated fabrics will be used for auto tops.

"Printing and Styling Trends." Lurelle Guild, Lurelle Guild Associates. Price, distribution, and coloring can affect the sales of plastics items even though styling is correct. The trends in price, distribution, and coloring can be taken out of the gamble class and predicted with almost mathematical odds by means of door-to-door surveys conducted by independent research organizations. Neither buyers nor salespeople are good consultants in predicting the effects of these factors on the sales of a new product.

"Radiant Heat for Vacuum Forming, Fusion, and Embossing." Geoffrey Broughton, Lowell Textile Institute. Plastics fabrication depends on obtaining proper material flow by use of heat. Theoretical considerations of heat transfer and its effect on material viscosity were given, and is was shown that vacuum forming, embossing, and fusion processes require a material viscosity in the range of 10^4-10^5 poises. In the case of polystrene, this viscosity corresponds to a temperature of about 20° C.

Thursday Afternoon, December 13

Arthur M. Ross, Ross & Roberts, Inc., presided over the luncheon and the technical session which followed. This session included two papers and a symposium of four speakers, as follows:

"Market Trends in Retailing Plastics Film and Sheeting." Joseph R. Rowen, W. T. Grant Co. The general sales trend of vinyl film, sheeting, and coated fabric products is still upward in 1951, but there are signs of leveling off in some items and declines in others. It is time now to solidify gains by better quality controls, material and product standards, and better knowledge of competitive materials. The public must be given more information on these plastics products, particularly the correlation between gage and strength. The industry must show integrity of patterns by eliminating copying and must also train retail sales people to keep the public informed of the advantages and disadvantages of plastics.

"Beta-Rage Gage — A Revolutionary New Method of Continuous Process Control." George B. Foster, Industrial Nucleonics Corp. This paper consisted of a discussion and demonstration of the new Model R AccuRay thickness gage for calendered sheet. A description of this gage appears in this issue under "New Machines and Appliances."

Symposium on **"Calendered, Cast, or Extruded Film?" "Characteristics of Calendered, Cast, and Extruded Film,"** M. G. Robinson, Bakelite Co. **"Calendered Film,"** N. J. Elder, Adamson United Co. **"Cast Film,"** D. G. Higgins, John Waldron Corp. **"Extruded Film,"** W. deCamp Crater, Naugatuck Chemical Division, United States Rubber Co.

Dr. Robinson presented a comparison of the calendering, casting, and extrusion processes for making vinyl film and sheeting. The advantages and disadvantages of each process were discussed, and a comparison was made of the products made by the three processes with respect to thickness ranges and tolerances, appearance, and physical properties. It was pointed out that each process has its inherent superiorities, but no one process is better than the others for all applications.

Mr. Elder noted that although the installation costs are more expensive than extrusion or casting, a calendering system for films is generally superior where large production runs are required. Recent installations can produce thin films at speeds of 150 yards a minute, and it is expected that future calenders may well be designed for operation at 200 yards a minute. Recent improvements which have made possible higher calender speeds include the use of peripherally drilled rolls, more accurate roll dimensions, roll crossing, in-line embossing, and automatic wind-up equipment.

Mr. Higgins presented a detailed discussion of film casting, including preparation of the vinyl compound, different casting and coating methods, film drying and fusing systems, and wind-up systems. A new development in the casting field is the manufacture of sponge vinyl sheet in a continuous operation without the use of side dams or pressure webs, by Interchemical Corp. While offering the greatest degree of versatility of the film production methods, casting also provides a useful supplement to calendered film manufacturing requirements.

Mr. Crater stated that extruded vinyl film is now on the verge of real commercial exploitation and should play a major role in the markets for thin gage (one mil to three mils) film. Because of its strength, clarity, and feel, extruded film is expected to find wide use in the packaging field. Processing techniques and formulations have been developed to a point where vinyl plasticized with monomeric, polymeric, and nitrile rubber type of plasticizers, either alone or in combination with each other, will yield extruded film that is satisfactory for packaging use.

Friday Morning, December 14

Wm. Merton, Rubber Corp. of America, presided over the morning session at which the following four papers were given:

"Epoxy Compounds as Stabilizers." F. R. Hansen, Ferro Chemical Corp. The degradation of polyvinyl chloride involves the liberation of hydrogen chloride. A good stabilizer must (1) remain passive until the vinyl liberates hydrogen chloride by itself and not remove hydrogen chloride from the plastic beforehand; and (2) form reaction products with hydrogen chloride that are soluble in the plastic system without giving a haze effect. Most of the epoxy compounds used as stabilizers are polymers of epichlorohydrin and polyals.

"Economic and Financial Trends in the Vinyl Film and Sheeting Market." A. James Mill, Mill Factors Corp. The vinyl film, sheeting, and coated fabrics industry is classified financially as a "growth" industry. Undercapitalization will continue to be a growing pain for several years more. Increased sales volume requires increased working capital, and even the most progressive firm must take a breathing spell from expansion of productive capacity to accumulate working capital.

"The Future of Vinyls in the Floor and Wall Covering Industry." G. E. Field, B. F. Goodrich Chemical Co. Since vinyls will improve the properties of linoleum and asphalt and rubber tile, they offer the best opportunity for the flooring manufacturer to upgrade the quality of his product and still do it economically. In the wall covering field, vinyls are limited to the upper 20% bracket of the market because of economic factors and equipment limitations.

"The Possibilities of Promulgating Trade Practice Rules for Vinyl Film." William T. Cruse, SPI executive vice president. Work has begun on the preparation and promulgation of SPI Vinyl Trade Rules patterned after the Worth Street Rules used by the textile industry to outline the conditions by which a buyer and a seller agree to transact business. The vinyl rules will consist of three parts: (1) sales note provisions; (2) a voluntary standard for general-purpose vinyl film; and (3) arbitration procedure for disputes. A committee has been set up by SPI to prepare these trade rules, and interested persons are invited to participate in the work.

Friday Afternoon, December 14

Gordon Brown, Bakelite Co. and SPI president, presided over the luncheon, which was followed by one speaker:

"Chain Store Merchandising of Plastics Film." Thomas E. Whiteman, F. W. Woolworth Co. While the importance of pricing of plastic film products for chain store merchandising is obvious, the industry should concentrate on quality and perfection of manufacture rather than on just a cheap price. Informative labeling is also needed, as well as customer education as to proper sewing techniques, and education of sales personnel to supply correct information to consumers.

Slogan Contest Winners

Winning entries have been announced for the slogan contest conducted by the Fifth National Plastics Exposition, sponsored by the Society of Plastics Industry, to be held March 11-14 in Convention Hall, Philadelphia, Pa. The $500 first

prize was given to George Whyte, Dominion Comb & Novelty Co., for the slogan, "Plastics Personify Progress." Gino Paccioretti, Columbia Protektosite Co., won the $200 second prize for his entry, "Choose Plastics for Performance"; while the third prize of $100 went to C. C. Campbell, Rohm & Haas Co., for "Plastics Make Things Better for Everybody." The contest drew 2,367 entries from all branches of the plastics industry both here and abroad. Judges were Vice Admiral C. W. Fox; Ben Hibbs, editor of *The Saturday Evening Post;* and Mayor Bernard Samuel of Philadelphia.

Public Relations Program

The newly formed SPI public relations committee recently held its organizational meeting at the Commodore Hotel, New York, N. Y. Attending were 24 members from companies representing the various branches of the plastics industry, and Chairman Edmund D. Kennedy, Monsanto Chemical Co., presided over the session.

To facilitate the task of fostering public acceptance and recognition of plastics, six key subcommittees were formed to handle various phases of the program, as follows: Hiram McCann, *Modern Plastics,* was named chairman of the speakers' subcommittee which will develop plans for a speakers' bureau; Robert T. Zintl, E. I. du Pont de Nemours & Co., Inc., will head the subcommittee to plan displays on plastics for use by museums, schools, and other public groups; Alfred C. Manovill, Ideal Plastics Corp., will lead the subcommittee on movies and films; Alan T. Wolcott, General Electric Co., will chairman the subcommittee on advertising; Arthur Blumenthal, Shawray Plastics Corp., will head the school relations subcommittee; and Philip A. Belk, Hercules Powder Co., will chairman the subcommittee on publicity.

Vibrin Polyester Resin

THE development of a new polyester laminating resin which will withstand temperatures as high as 500° F. has been announced by Naugatuck Chemical Division, United States Rubber Co., Rockefeller Center, New York 20, N. Y. Called Vibrin X-1047, the new resin is expected to find its most significant use as a structural material in the manufacture of high-speed aircraft and guided missiles.

A clear, straw-colored liquid in appearance, the resin has a disk viscosity of 45 poises at 25° C.; specific gravity of 1.209 at 25° C.; and a curing rate of 87 seconds at 110° C. in a metal cell. The uncatalyzed storage is more than six months at 25° C., and more than 48 hours at 70° C. The catalyzed storage stability is more than 48 hours at 25° C. when 1½% benzoyl peroxide is used as catalyst.

Laminates made with the resin and glass fabric retain good flexural strength (40,000-47,000 psi.) when exposed for as long as 200 hours at temperatures of 300° F., it is further claimed. Good flexural strength (more than 30,000 psi.) is also obtained when the laminates are exposed for as long as 24 hours at 500° F. The heat resisting properties of the resin are made possible by the use of triallyl cyanurate.

While initially available only for military applications, production of Vibrin X-1047 is being boosted in order to supply applications requiring heat resistance in the electrical, electronic, and other industries.

ASTM Committee D-20 on Plastics

ASTM Committee D-20 on Plastics and its subcommittees held their fall meeting on November 12-14 at the General Brock Hotel, Niagara Falls, Ont., Canada. Chairman Gordon M. Kline, National Bureau of Standards, presided over the meeting, and Bruce L. Lewis, Tinius Olsen Testing Machine Co., was secretary.

Advisory Committee Meeting

The D-20 advisory committee met on the evening of November 13. The chairman reported that a new section of Subcommittee V on Permanence will be organized to set up a weathering program at the ASTM test site. It was also decided that at least one paper on statistical methods be presented at each meeting of Subcommittee VIII on Research to cover new ideas in statistics. The committee also decided that a member from D-20 should be appointed to the ASTM advisory committee on corrosion.

At the annual meeting in June, D-20 will present a symposium on plastics consisting principally of reviews of current testing procedures and forecasts of the future of plastics testing.

Committee D-20 Meeting

The D-20 meeting was held in the afternoon of November 14, and the various subcommittee reports were presented and discussed.

The spring meeting of D-20 will be held in Philadelphia, Pa., during the week of February 15. The June meeting will be held in conjunction with the ASTM annual meeting in New York, N. Y. The fall meeting will be held in Boston, Mass., in mid-October.

Subcommittee Meetings

Subcommittee 1—Strength Properties on Plastics. M. E. Marks, Columbia-Southern Chemical Corp., chairman. Methods for determining the tensile properties of thin films are being set up. Three methods are to be tested, involving the inclined plane machine, the pendulum machine, and the Instron machine. The ski-ball test for impact strength will be proposed as a new method in the near future. Work is proceeding on developing a method for determining the bursting and tear strengths of thin film.

Subcommittee 2—Hardness Properties of Plastics. L. W. A. Meyers, Tennessee Eastman Corp., chairman. A method for determining the Barcol hardness of plastics was presented which will be tested by a number of the laboratories.

Subcommittee 3—Tensile Properties of Plastics. E. B. Cooper, E. I. du Pont de Nemours & Co., chairman. It is believed necessary at present to set up a standard method for the SPI flammability machine. An extrusion plastometer was discussed. Test method D746-44T on brittle temperature of plastics and elastomers has been revised and passed a D-20 letter ballot.

Subcommittee 4—Optical Properties of Plastics. H. K. Hammond, NBS, chairman. As the result of round-robin tests, it has been decided to write up the Olsen Armstrong mechanical abrasion machine method, which gives good results in determining the wearability of plastics. The round-robin study on clear plastics by the Taber machine is almost finished and will be reported at the next meeting.

Subcommittee 5—Permanence Properties of Plastics. J. W. Mighton, Dow Chemical Co., chairman. This committee is preparing a method for use in testing samples at the ASTM weathering sites.

Subcommittee 6—Specifications. Lucius Gilman, Picatinny Arsenal, chairman. Final objections to the new specification on polyester molding compounds were resolved, and the specification is now ready for acceptance by ASTM. The specification for cellulose acetate film for primary insulation is submitted for D-20 letter ballot; while proposed standard D744 on non-rigid vinyl chloride plastics will be given a letter ballot among subcommittee members. Seven other specifications are being worked on, including specifications on polyethylene and polyamides.

Subcommittee 7—Analytical. D. C. Northrup, Tennessee Eastman, chairman. Work is proceeding on developing a specification for dioctyl phthalate and other plasticizers. Some consideration is being given to developing methods for vinyl polymers.

Subcommittee 8—Research. C. R. Stock, American Cyanamid Co., chairman. E. B. Cooper discussed the latest information on the "melt indexer," a volumetric method for determining the melting characteristics of polythylenes. The method has extreme precision and speed of testing and consists of placing a weighted piston on the material held in a heated chamber. The extruded plastic is measured by a dial gage. A continuous curve can be obtained, and the characteristics of the material determined.

R. D. Ward, American Cyanamid, discussed the measurement of residual stresses in thermosetting plastics. The method involves determining the bending characteristics of a test piece which is gradually decreased in size by a milling machine. Urea, melamine, and phenol formaldehydes have very great internal stresses owing to the molding conditions.

I. L. Hopkins, Bell Telephone Laboratories, discussed the relaxation characteristics of some rubber-like materials. Load-time curves were presented to show how the force varied with time. This method involved holding the specimen in compression in a suitable jig and measuring the load as the material relaxed. The method presents a useful means of determining the characteristics of gaskets.

Subcommittee 10—Definitions, Nomenclature. C. H. Alexander, B. F. Goodrich Chemical Co., chairman. Many terms relating to plastics were discussed and presented to D-20 for letter ballot.

Subcommittee 14—Conditioning. A. C. Webber, du Pont. chairman. Plans are being made to study several methods for determining humidity. Methods for conditioning plastics at other than normal temperatures were discussed. Two categories of ovens or chambers will be made standard: Type A, where the maximum temperature fluctuation can be no more than 2° C., and Type C, where the maximum fluctuation can be no more than 5° C.

Holds Panel Discussion

A PANEL discussion on "Present and Future Uses of Rubbber and Plastics in the Automotive Industry" featured the second meeting of the Fort Wayne Rub-

ber & Plastics Group, held November 29 in the Van Orman Hotel, Fort Wayne, Ind., with 255 members in attendance. J. R. Shroyer, R. T. Vanderbilt Co., acted as moderator, and the panel members were H. V. Beckerleg, Fisher Body Corp.; A. L. Carter, Chrysler Corp.; A. J. Kearfoot, General Motors Research Corp.; M. J. Sturtevant, Chrysler; and K. T. Totten, Ford Motor Co.

S. G. Byam, of E. I. du Pont de Nemours & Co., Inc., who is vice chairman of the Division of Rubber Chemistry, A.C.S., also spoke briefly on the requirements the Group must fulfill to obtain a charter from the Division. In the business session preceding the panel discussion, Elmer I. Ramga, United States Rubber Co. and secretary-treasurer of the Fort Wayne Group, was presented with membership card No. 1 in recognition of his services in organizing the Group. It was also voted to extend honorary memberships to the following members of the Chicago Rubber Group for their assistance in conducting the initial meeting of the Fort Wayne Group: Richard Blair, Columbia Southern Chemical Corp.; Eli Grossman, Tumpeer Chemical Co.; V. Parednis, Kraft Chemical Co.; S. F. Choate and M. J. O'Connor, both of O'Connor & Choate, Inc.; and J. F. Taylor, Commercial Solvents Corp. It was announced that the Fort Wayne Group now has 222 members.

New Boltaron Distributer

RIGID vinyl plastic tubing, piping, rods, sheets, blocks, and molding compounds in the Boltaron 6200 series, made by Bolta Products, Inc., Lawrence, Mass., will be distributed by H. N. Hartwell & Son, Inc., Boston. Based on Geon 404, a product of B. F. Goodrich Chemical Co., the Boltaron 6200 series plastics provide extreme resistance to chemicals. Hartwell will offer complete engineering service to Boltaron fabricators and users. Training centers for fabricators have been established, and a complete warehousing service will be provided.

Hartwell's plastics division is headed by Vice President William P. Elwell, with Kenneth Chamberlain as vice president-sales. W. F. Marsh is northeast regional sales manager; while Larry Thomas is regional sales manager of the Wilmington, Del., office. The distributing firm will concentrate on such industries as chemical processing, rayon, food, beverage, and plating where corrosion and chemical resistance are important factors.

Textured Plastic Tile

PLASTIC wall tile with the appearance and texture of sandblasted wood is the latest development for homeowners seeking a fresh, attractive, and practical solution to wall surface problems. Molded of Monsanto's Lustrex polystyrene plastic and marketed under the name Deco-Tile by Nalle Plastics, Inc., Austin, Tex., the new wall covering was created in response to a demand for tile with new decorative possibilities. With its deeply striated surface effect and wide color availability, Deco-Tile offers new decorative effects while retaining the easy application and long service life of standard polystyrene tile.

SPE Section Reports

THE New York Section, Society of Plastics Engineers, held its annual Christmas party December 19 at the Gotham Hotel, New York, N. Y. Seventy members and guests attended the affair, which included a cocktail hour, dinner, floor show, and the distribution of table favors and door prizes. Arrangements for the entertainment program were handled by Saul Blitz, Noma Electric Co.

The 1952 officers and directors of the Section were announced as follows: president, Bruno E. Wessinger, Wess Plastic Molds, Inc.; vice president, A. M. Merrill, India RUBBER WORLD; secretary-treasurer, Arthur L. GeWertz, manufacturers' representative; national council representative, Stanley Bindman, Jamison Plastics Corp.; and directors in addition to the officers, Mr. Blitz, George Baron, Ideal Plastics Corp., Wm. Lewi, Dusal Tool & Mold Co., Harold Schwartz, Empire Brushes, Inc., Russell H. Skidmore and J. Martin Voegtlen, Celanese Corp. of America, and Sanford S. Zimmerman, F. J. Stokes Machine Co.

Newark Section 1952 Officers

More than 90 members and guests of the Newark Section, SPE, attended the annual Christmas party on December 12 at the Military Park Hotel, Newark, N. J. After a cocktail hour and dinner, the members took part in roulette and other casino games, using stage money supplied by the Section. The luckier gamblers were then able to use their winnings to obtain a series of prizes auctioned off to the highest bidders.

The Section's 1952 officers were announced as follows: president, Edward W. Rowan, Dillon-Beck Mfg. Co.; vice president, Joseph L. Bonanno, Lionel Corp.; secretary-treasurer, Jack R. Pecktal, Tennessee Eastman Corp.; and directors (for three-year terms), W. W. Gryce, Newark Die Co., Anthony Naturale, industrial designer, and E. K. Preston, Koppers Co., Inc.

Borro Speaks at Chicago

Some 125 members and guests attended the November 14 joint dinner-meeting of the Chicago Section, SPE, and Midwest Chapter, SPI, held at the Builders Club, Chicago. Speaker of the evening was Edward F. Borro, Sr., Durez Plastics & Chemicals, Inc., who discussed the "Closed-Mold Molding Technique."

Mr. Borro's talk dealt with extensive experiments made with specially designed injection molds in an effort to determine the factors involved in the successful design of gates and runners in molds for thermosetting materials. The general aims of these experiments were (1) minimum use of pressure; (2) longest possible flow of material for maximum strength and dimensional stability; (3) smallest possible runners to prevent waste; and (4) smallest possible gates to minimize finishing operations.

Actual experimentation proved the desirability of restricted circular gating responsible for the creation of a "tubular insulator" when the charge comes into contact with the hot mold surface. This insulator retards material reaction in the center of the runner, thereby permitting longer flow time. Other experiments showed that no advantage is gained by using more than one gate. Since flow generally takes the path of least resistance, the center gate of a multiple-gate system is usually the flow path. In addition, with multiple gates the flow may be diverted from one gate to another because of various obstructions, thus giving alternating shots.

Mr. Borro stated that runners should be held to a minimum length for best results since an eight-inch long runner may require twice as much molding pressure as a two-inch runner. For greatest efficiency round runners are best, with square cross-section runners being next in preference. Both the method of preheating and of molding affects dimensional shrinkage of parts. Least shrinkage is obtained by use of high-frequency preheating and compression molding; while maximum shrinkage is obtained with steam preheating and plunger molding.

Despite general belief that the closed-mold method gives greater dimensional accuracy and stability in parts than compression molding, in most instances this was not found to be true, the speaker declared. In fact, the closed-mold method involves greater dimensional and warpage problems, with most of the difficulties being traced to improper pressures, gating, plunger speeds, preheating, and air venting. Runners and gates which allow the material to enter the mold in a most fluid state will give satisfactory parts by the closed-mold technique.

The second annual joint Christmas party of the Chicago Section and the Midwest Chapter was held at Edgewater Beach Hotel on December 8. More than 500 members and guests attended the affair, which included a cocktail hour, dinner, entertainment program, and an evening of dancing. The committee in charge of arrangements consisted of Wm. K. Woodruff, Celanese Corp. of America; Ben Rau, G. Felsenthal & Sons; and Wm. Snow, Snow Plastics Corp.

Aircraft Applications

A TALK on "The Use of Rubber and Plastics in the Aircraft Industry," by Leith Balfour, A. V. Roe Co., highlighted the December 11 dinner-meeting of the Ontario Rubber Section, C.I.C. Approximately 50 members and guests were present at the meeting, held at Hart House, University of Toronto, Toronto, Ont., Canada.

Mr. Balfour noted that materials intended for application in aircraft must be considered in relation to their end-use. After giving a review of the various types of rubbers and plastics and their applications in aircraft, the speaker pointed out that higher speeds and higher altitudes greatly affect the behavior of materials used. Specifications, therefore, are drawn up to very close tolerances, and it is essential that products conform to these specifications.

DeBell on Plastics Abroad

A DISCUSSION of the plastics industry both here and in Europe was given by John M. DeBell, DeBell & Richardson, Inc., before the November 15 meeting of the Elastomer & Plastics Group, New England Section, American Chemical Society. Some 40 members and guests attended the meeting, held at MIT, Cambridge, Mass.

(*Continued on page* 474)

Scientific and Technical Activities

ASME Rubber & Plastics Division Meeting Well Attended

THE one-day meeting of the Rubber & Plastics Division, American Society of Mechanical Engineers, held at Atlantic City, N. J., at Chalfonte-Haddon Hall, November 27, attracted a very satisfactory attendance of between 100 and 125 members and guests of the Division. The meeting was a part of the 1951 annual meeting of the parent Society.

The Division meeting was composed of three technical sessions and a luncheon-meeting of the executive committee. Newlin Keen, E. I. du Pont de Nemours & Co., Inc., 1951 chairman of the Division, opened the technical sessions and presided at the meeting of the executive and advisory committees. At the conclusion of this meeting the 1952 chairman of the Dvision, Glen W. Neely, The Richardson Co., assumed office.

Technical Session 1

The chairman for the first technical session was J. H. Dubois, manager, new product development, Plax Corp.; and vice chairman was J. M. Church, associate professor of chemical engineering Columbia University.

The first paper at this session was entitled, **"On the Accuracy of Extrapolated Creep Test Relations for Plexiglas Subject to Various Stresses,"** by Prof. Joseph Marin and Yoh-Han Pao, Pennsylvania State College. Many creep-time relations for materials are obtained for short periods of time—usually for 1000 hours or about 40 days. In many applications, however, the life of the member is much greater than 1,000 hours. For the relations used and for the material tested, it was found that the extrapolated values gave good engineering approximations to the actual values.

The creep measurements were taken in tension, compression, pure bending, and torsion, and the apparatus used was shown. Data for actual *versus* theoretical values for times up to 10,000 hours were presented. The engineering relation for 1,000-hour creep data can be used for longer periods up to one year, it was pointed out.

"Effect of Velocity on Tensile Impact Properties of Polymethyl Methacrylate" was the second paper at the morning session. The authors were Bryce Maxwell and J. P. Harrington, Princeton University. In this paper the history of impact testing of plastics was reviewed, and the current theories of impact resistance were discussed. The effect of velocity on the energy absorbed by polymethyl methacrylate at various temperatures was studied with the aid of two new testing machines.

The results were interpreted in terms of the classical theories of mechanics of materials and the current theories of the rheology of high polymers. It was concluded that there are two distinct critical velocities of straining in this material—the lower one corresponds to the relaxation of the bonds restraining chain-chain slipping, and the higher one corresponds to the relaxation of the secondary bonds involved in chain uncoiling. Both of these relaxations are temperature dependent—the lower one to slight extent and the upper one to a marked extent. Above the two critical velocities the response of the material is purely elastic.

A method of calculating the energy to break at rates of straining above the second critical velocity from the slow-rate stress-strain curves was demonstrated.

Some additional data on the tensile impact properties of vinyl, ethyl cellulose and phenolic plastics, not available in the preprinted paper No. 51-A-65, were presented.

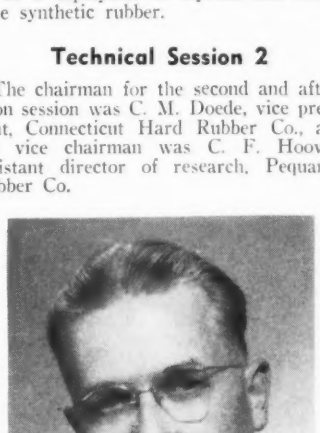
"High Impact Styrenes—A New Class of Thermoplastic Material" was the subject of the last paper of the first session, which was prepared by Sanford E. Glick and C. H. Adams, Monsanto Chemical Co. Some general review of the growth of the plastics industry during the past ten or more years was first presented. Of particular note was the estimate that in 1953 the per capita consumption of plastics in the United States would be 16.1 pounds. Many of the physical properties, impact strength, dimensional stability, heat stability, and stress strain characteristics, and also the electrical properties of high-impact styrenes were presented in comparison with a general-purpose styrene and cellulose acetate. Graphs showing the effect of temperature on physical properties were shown.

The numerous applications of high-impact styrenes, including refrigerators, toys, textile machinery, pipe etc. were mentioned, and the future for this-type styrene was reported as bright. Color or transparency was said to be somewhat less satisfactory than with general purpose styrenes as were weathering properties.

The high-impact styrenes were reported to be a copolymer of styrene and nitrile type synthetic rubber.

Technical Session 2

The chairman for the second and afternoon session was C. M. Doede, vice president, Connecticut Hard Rubber Co., and the vice chairman was C. F. Hoover, assistant director of research, Pequanoc Rubber Co.



Merrill Chase—Town House

Glen W. Neely

"Properties of Some Heat Resistant Adhesives" was the subject of the first paper at this session, by A. J. Kearfott and Craig W. Roush, General Motors Corp. Adhesives for bonding brake linings, transmission parts, etc., of the phenolic resin-nitrile rubber type were discussed, with special reference to the shelf life of the uncured adhesives and testing methods for determining bond strength of assemblies at temperatures up to 500°F. Shear strengths for these adhesives of greater than 1000 p.s.i. at room temperature were reported.

"Rubber-Plastic Compositions" were discussed next by E. S. Ebers, Naugatuck Chemical Division, United States Rubber Co. The concept of a tough, strong, chemically resistant, low cost, readily formable, good color, rigid material has been in the minds of resins chemists ever since the days of Hyatt and Baekeland, it was pointed out. Realization of this goal has come a step nearer by the development of rigid thermoplastic resin-rubber blends directly usable in the low-cost injection molding and extrusion processing methods of the present days.

"Kralastics" in molding and extrusion granules or as latices are used for the manufacture of a variety of products including refrigerator parts, automotive parts, tote boxes, chemical pipe and fittings, combs, etc. The material is also in the form of formed parts and solid and expanded sheet for outside fabricators under the name of "Royalite," and as molded and extruded articles as "Uscolite," although this latter name does not exclude other plastic materials.

"Selected Plastics Literature References for the Mechanical Engineer, July, 1950-June, 1951" was the title of the last paper of the afternoon session. The author is Gordon B. Thayer, plastics technical service, Dow Chemical Co. This paper is published on page 444.

The very interesting and informative motion picture "Inside the Injection Mold," by Dow Chemical was shown and explained by Mr. Thayer. A special mold with 1½-inch thick glass walls was built by Dow research engineers, and photographs of the filling of the mold under varying conditions were obtained.

Technical Session 3

The chairman for the evening session was D. F. Fraser, vice president, Rodic Chemical & Rubber Corp. The vice chairman was B. L. Lewis, Tinius Olsen Testing Machine Co.

"A New Rotary Seal for High-Speed and High-Pressure Applications" by T. J. McCuistion, Precision Rubber Products Corp., was the first paper on the evening program. A description of the theory and progress of the development of "O" rings for use as oil seals and/or rotary shaft seals was given. Instead of 250 f.p.m. as the maximum operating speed a new development makes possible the use of these new seals at shaft speeds of 2,000 f.p.m. or more. Probable causes of failure and their correction were discussed, and test equipment used was described. Publication of this paper is planned for an early issue of India Rubber World.

"Applications of Silicone Rubber." by

C. W. Pfeiffer, General Electric Co., was the second paper on the third-session program. Recent developments, such as higher strength silicone rubber, improvements in low-temperature properties, and the development of techniques for bonding rubber to metal, have increased the interest of design engineers in silicone rubbers, it was said. Now the availability of silicone gum rubber for compounding by the product fabricator is another step in the fuller utilization of the properties of silicone rubber, the author added.

"Selected Rubber Literature References for the Mechanical Engineer, july, 1950-June, 1951," was the final paper on the program. The authors were R. E. Shrader and R. M. Turner, of du Pont. This paper appears on page 440.

Executive and Advisory Committee Meeting

At a luncheon-meeting of the executive and advisory committees it was decided that the Division would hold two sessions at the fall meeting of the Society in Chicago, Ill., and three sessions at the annual meeting in New York to be held about December 1.

Gavels and Certificates of Award from the Society in recognition of their work as members of the executive committee and as chairman of the Division were presented to 1950 chairman, Frank Warner, General Electric, and Newlin Keen, the retiring 1951 chairman.

The 1952 Division chairman is Glen W. Neely, The Richardson Co., and the 1952 secretary, M. E. Lerner, *Rubber Age*. Appointed to the executive committee for a five-year term was R. G. Seaman, India RUBBER WORLD. The retiring chairman becomes a member of the advisory committee.

Fred Wehmer, Minnesota Mining & Mfg. Corp., was appointed reporting representative for the 1952 meetings of the Division.

E. V. Osberg, General Tire & Rubber Co., and F. L. Houshalter, Firestone Industrial Products Co., were appointed to the general committee.

There was discussion of the work of the membership development committee headed by Mr. Lerner and of the work of the research committee, which is at present without a chairman. Plans for 1952 programs were also discussed, and a preliminary schedule was considered.

Achievement Award Dinner for Phillips

ALMOST 1,000 representatives of the petroleum, chemical, rubber and associated industries, and of the financial and academic world, together with representatives of government and the press, gathered on the evening of November 28 at the Waldorf-Astoria Hotel, New York, N. Y., to witness presentation of the 1951 Award for Chemical Engineering Achievement to the Phillips Petroleum Co., Bartlesville, Okla.

This award was given Phillips "in recognition of its meritorious contribution to the advance of the industry and profession made possible through a broader participation by the chemical engineer in the affairs of the process industries." Specifically, the award was given for two interrelated achievements: (1) commercial development since 1948 of high abrasion carbon black and (2) major contributions to the sucessful development of cold rubber.

The Award for Chemical Engineering is presented by *Chemical Engineering*, a McGraw-Hill publication. The recipient is determined by secret ballot of an awards committee, headed by Alfred H. White, professor-emeritus of chemical engineering at the University of Michigan. The committee comprises 70 senior chemical engineering educators of the United States.

Sidney D. Kirkpatrick, editorial director of *Chemical Engineering* and *Chemical Week* and vice president of McGraw-Hill Book Co., who also serves as secretary of the Committee of Award, was toastmaster.

Professor White presented the plaque to the Phillips company, and K. S. Adams, chairman of Phillips Petroleum, accepted on behalf of the company.

In his acceptance Mr. Adams emphasized that development of high abrasion carbon black and major contributions to the success of cold synthetic rubber by Phillips had together tipped the balance from natural to synthetic rubber for tire treads, thus making the United States more nearly self-sufficient in rubber, contributing to the nation's defense, and insuring low-cost transportation for our millions of motorists.

Karl T. Compton, chairman, Massachusetts Institute of Technology, and director, McGraw-Hill Publishing Co., was speaker of the evening. His subject was "Conditions Favorable for Technological Achievement."

Dr. Compton listed as factors essential to an environment favorable to sustained creative enterprise incentive, opportunity, reward, prestige, and regulation and tax policies which stimulate and encourage new technological developments. These factors involve matters of public policy which are of very great concern to every person in the country, he added.

Obviously, in such a complex society as ours, some regulations and safeguards are necessary in the overall interest. But there are insidious dangers lest these necessary functions of government be extended in directions which are not in the public interest and which threaten our free enterprise system. Three of the most serious of these dangers, i.e., government subsidy, the present tax structure, and the recent activities of the Anti-Trust Division of the Attorney-General's Office, were mentioned and discussed at some length.

Government subsidies tend to perpetuate technological obsolescense, it was said. The present tax structure does not provide an adequately healthy environment for promotion of new technological developments. High excess profit taxes do undoubtedly serve as a deterrent to exactly the type of industrial growth which is most desirable — that aimed at new products, added employment, and new sources of profits (and of taxes.

The recent activities of the Anti-Trust Division of the Attorney-General's Office were considered the most glaring example of all, with respect to policies which discourage the type of free enterprise so essential to our future prosperity and strength, Dr. Compton said. Suits have been brought against companies for doing what they were asked or required by other governmental departments to do. Suits have been brought to break up an integrated industrial program of production and distribution, even though this integration is efficient, results in better service at lower net cost to the public, and operates amid intense competition, and suits have been brought where the only real basis is size and efficiency.

Suits have been brought to deprive a company of the rewards presumably intended by our patent laws, even though the company spent millions on the new development, has actively developed an eager public market, has encouraged other manufacturers, has met stiff competition, and has made the product available to the public at a very acceptable cost, it was said.

We should do something to curb these threats to the enviroment within which our free enterprise system has flourished and has brought to us all unprecedented opportunities and standards of living, Dr. Compton warned. The first thing to do is to have them brought out into the open, for the public to see and understand, he concluded.

Chicago Chemical Show

PLANS are already well advanced for the Seventh National Chemical Exposition, sponsored by the Chicago Section, A. C. S., to be held in the Chicago Coliseum on September 9-13, 1952. Nearly 200 manufacturers of chemical products and equipment will display their latest developments; while a number of top scientists in various chemical fields will participate in a unique type of scientific program. Details of this program are not complete as yet, but it will revolve around the general theme of the meeting, "The Next Half Century—Even Greater." More than half the available exhibit space has already been taken by companies who participated in the preceding expositions.

Quebec Group Hears Downey

A TALK on "Vulcanization with Organic Sulfur Compounds," by P. M. Downey, Monsanto Chemical Co., featured the final dinner-meeting of the season of the Quebec Rubber & Plastics Group. The meeting attended by some 70 members and guests, was held at the Queen's Hotel, Montreal, P.Q., Canada.

Mr. Downey began his talk with a review of recent literature on the structure of MBT (2-mercaptobenzothiazole). This is evidence for this material's existence in the thione form and its probable existence in the solid state as a symmetrical bimolecular complex. The use of a mixture of 2-(2,4-dinitrophenylmercapto) benzothiazole and N-cyclohexyl-2-benzothiasole sulfenamide in reinforcing furnace black stocks was discussed; next came a review of the preparation of thiazolesulfenamides and their use as accelerators.

The speaker then dealt with the vulcanization of GR-S with xanthic sulfides, phenol sulfides, and dithioamines, and the use of 4,4'-dithiodimorpholine and N,N'-dithiobis-isopropyl aminopropionitrile as replacements for sulfur in high modulus, high abrasion furnace black stocks. Mr. Downey concluded with a discussion of the reactions of sulfur with olefinic substances and the probable systems obtained with the various accelerators. He noted that the thioamines probably yield alkylalkly monosulfide systems.

Abstracts of Papers Presented at Abrasion Symposium

ABSTRACTS have been received of the papers presented at the International Symposium on Abrasion and Wear, held at the Rubber-Stichting, Delft, Holland, on November 14 and 15. Details of the symposium program appeared in our September issue, page 707. The abstracts are as follows:

"The Friction and Surface Damage of Non-Metallic Solids." F. P. Bowden, Cambridge University, England.

An investigation was made into the frictional behavior of a number of non-metallic solids, including diamond, graphite, carbon, and a variety of plastics. Frictional tests were made both with and without surface films on the solids, and surface damage was studied by autoradiographic methods and electron microscopy. The frictional behavior of these solids is similar to that of metals, with important differences, and a theory covering the mechanism of friction is advanced.

"War on Wear." H. Blok, Royal Dutch Shell Laboratory, Thornton, England.

The aims of any campaign on wear prevention must include not only a savings in the value of the material worn off, but also savings in labor costs. It is the element of unpredictable destruction caused by lack of control that distinguishes the abnormal from the normal types of wear. The fundamental methods of combating wear are: (1) inhibiting contact of the wearing surfaces by means of platings, lubricants, or other protective layers; (2) changing the wear from a destructive to a permissible type; and (3) transferring the wear to the most easily replaceable rubbing surface.

"Chemical Causes of Wear." J. J. Broeze, Royal Dutch Shell Laboratory, Delft.

Examples were reviewed of instances where chemical actions underlies the mechanism of wear of machine parts. These instances can be classified into those involving oxygen and other gaseous constituents of the air; those involving corrosive materials, either directly or indirectly; and those cases where combinations of the preceding factors are involved.

"Morphological Aspects of Abrasion and Wear." G. Salomon, Rubber-Stichting.

This paper emphasized the significance of careful microscopic observations in analyzing damage caused by abrasion and wear, and the use of a comparative method of interpretation related to that of biological morphology. Topics discussed were the wear of textiles and the surface cracking of polymers. Wear of textiles is primarily a problem of dynamic fatigue, with abrasion being only a minor cause of damage. The useful life of textiles is limited by two fatigue phenomena: (1) crack-growth across the fiber, leading to a series of brittle fractures; and (2) longitudinal fibrillization.

It is known that the strain dependence of ozone cracking of polymers varies with the mechanical properties of the polymer film. In physically initiated stress-cracking of rubbers and plastics the crack-growth resembles that observed in ozone cracking. The phenomena of stress-cracking was briefly discussed, and an attempt was made to classify the causes of wear and their underlying statistical patterns.

"Abrasion and Wear of Rubber." J. M. Buist, Imperial Chemical Industries, Ltd., Manchester, England.

It is shown that wear curves for a wide range of rubber stocks tested on a variety of laboratory machines are all in the same family, expressed by an empirical equation of $y = ax^n$. Wear curves from road tests on tires are also in this family, and there is reason to believe that sole and heel test data could also be similarly expressed. The fact that this equation does have such a wide application in the wear testing of rubber in the laboratory and in service is of interest and importance.

Using this method, it is possible to construct wear curves from measurements made in the initial stages of wear. Having calculated the constants in the equation for different compounds, it is possible to calculate what the wear will be in subsequent stages. Data were presented to show the agreement between calculated and measured wear values for various laboratory methods and road wear tests.

"Studies in the Abrasion of Rubber." A. Schallamach, British Rubber Producers' Research Association, Welwyn Garden City, England.

The first part of this paper covered a simple case of abrasion consisting of scratching rubber with a needle under various loads and at different speeds. The traces produced by the needle, and the corresponding force-time records, were found to depend markedly on the nature of the rubber compound. Traces on pure gum vulcanizates are always discontinuous, and the force-time curves are of the sawtooth type. On the other hand the traces on black-loaded stocks, such as tire treads, are continuous, and the force-time curves show very much smaller deflections. Surface damage on all types of rubbers is characterized by the fact that small pieces of partly detached rubber are found in the wake of the needle and are easily removed when the surface is attacked again.

The second part of the paper dealt with the "abrasion pattern" found on abraded rubber surfaces and consisting of an array of approximately parallel ridges oriented at right angles to the direction of abrading motion. A cross-section through an abraded rubber surface shows that the profile of these ridges is asymmetrical, and it is possible to identify the direction in which the abrasive moved relative to the surface. It has been discovered that the pattern moves as a whole in the same direction as the abrasive during the abrasion operation. The origin of the pattern is probably a direct consequence of the high elasticity and high frictional coefficient of rubber. The pattern has proved to be an important clue in deducting the conditions under which abrasion occurs on the road.

"The Abrasion Resistance of Paints." N. A. Brunt, Paint Research Institute, Delft.

Data were presented to show that it is possible to predict the abrasion resistance of lacquers of defined composition when the fundamental mechanical properties of the basic material are known.

"Some Factors Influencing the Road Wear of Tires." R. D. Stiehler, M. N. Steel, and J. Mandel, National Bureau of Standards, Washington, D. C., U.S.A.

Three road tests of tires for tread wear were statistically designed to study some of the factors influencing wear. Among these factors were the effects of vehicle, wheel position, day of test, climate conditions, and length of storage. A study was also made of two methods of measuring depth of tread grooves and weight loss.

It was found that a tire loses weight at essentially a constant rate; whereas the depth of tread grooves decreases at a declining rate, which results in a bias in the tread wear ratings. The weight method was also found to be more sensitive than the depth method.

As to effects of vehicle and wheel position, it was found that differences in the rate of wear on different wheels do not affect tread wear comparisons, since the rate in slow wearing positions is proportional to that in fast wearing positions, and the coefficient of variation is about the same. These results led to the conclusion that geometric rather than arithmetic averages be used in evaluating tread wear.

The study of the effect of the day of test and the climatic conditions indicated that the surface temperature of road and tire has a pronounced effect on rate of wear. Natural rubber treads containing channel black wore faster as the temperature increased; whereas synthetic rubber treads containing furnace blacks wore faster as the temperature decreased. Other treads wore at about the same rate despite temperature changes. The effect of temperature on tread wear was greater in many instances than the effect of a lower coefficient of friction on wet roadways.

Storages of tires generally increased the rate of wear, although some treads did not wear faster after one year of storage. A test was made to determine the effects of type of rubber and black on tread wear, but it was found that rubber and black are mutually independent in their effects, and it was impossible to make comparisons without stating the conditions of test.

Rubber Division Meetings

THE Division of Rubber Chemistry of the American Chemical Society has scheduled two meetings for 1952, both separate from the meetings of the parent Society.

The Spring Meeting is set for Cincinnati, O., April 30, May 1, and May 2, with headquarters at the Netherland Plaza Hotel. The fall meeting is planned for Buffalo, N. Y., with headquarters at the Hotel Statler, on October 29 to 31.

The Spring Meeting is being sponsored by the Southern Ohio Rubber Group. Stewart L. Brams, Dayton Chemical Products Laboratories, is general chairman in charge of arrangements for this meeting, and Donald Bertke, Texo Corp., is associate chairman and treasurer.

The 25-Year Club will hold a luncheon at noon on April 30, with A. C. Eide, American Zinc Sales Co., as chairman.

The papers committee of the Division is soliciting abstracts of papers on any subject connected with the rubber industry for presentation at these meetings. The abstracts should run about 200 words in length. Three copies of such abstracts of papers for the Cincinnati meeting must be in the hands of C. R. Haynes, Binney & Smith Co., 41 E. 42nd St., New York 17, N. Y., secretary of the Division, by February 29, 1952, and three copies of the completed manuscript must be available at the date of the meeting. The laboratory in which the work was done, time desired for presentation, and an indication of the person who will present the paper, should accompany the abstract. Society regulations require that at least one of the authors must be a member of the A. C. S.

Groups' Holiday Parties

MOST of the local Rubber Groups last month held their usual annual parties instead of the customary technical dinner-meetings. Reports on some of these festivities follow.

New York Group Celebrates

About 450 members of the New York Rubber Group were present at the Christmas celebration at the Henry Hudson Hotel, New York, N. Y., December 14, although quite a few members could not reach the hotel until after dinner owing to transportation difficulties because of the bad weather.

The program included a cocktail party, dinner, entertainment, and the usual drawing for prizes made possible by the contributions of supplier companies and other friends of the Group. About 110 very fine prizes were distributed to holders of lucky numbers.

M. R. Buffington, consultant, presided at dinner and introduced the new officers of the Group who were present. The complete list appears on page 327 of our December issue. In the absence of the new chairman, J. S. Corrigall, R. T. Vanderbilt Co., the new vice chairman, G. N. Vacca, Bell Telephone Laboratories, presided briefly and then turned the meeting over to B. B. Wilson, India RUBBER WORLD, secretary-treasurer for 1951, who was in charge of the entertainment and prize drawings.

Following several variety acts, one of which involved some helpful participation by one of the Group's new directors, Frank Malm, consultant, as a magician's assistant, the distribution of the prizes concluded one of the Group's most successful parties.

Boston Group Beats Storm

The worst storm of the winter failed to dampen the enthusiasm of 475 members of the Boston Rubber Group who attended the annual Christmas fete on December 14 at the Somerset Hotel, Boston, Mass. The party included a cocktail hour, dinner, distribution of many door prizes, and a gala entertainment program of vaudeville acts. Richard Patrick, Vulplex, Inc., was chairman of the entertainment committee.

Following the dinner, Elections Committee Chairman Ralph B. Huber, Ralph B. Huber, Inc., gave the results of elections for 1952 officers of the Group, as follows: chairman, John Andrews, Godfrey L. Cabot, Inc.; vice chairman, Alan W. Bryant, Binney & Smith Co.; secretary-treasurer, W. Fraser Malcolm, Titanium Pigments Corp.; and executive committee, Edward Covell, Stedfast Rubber Co. (one year), and James E. Williamson, Tyer Rubber Co. (two years).

Announce 1952 Officers

The Detroit Rubber & Plastics Group held the largest and most successful Christmas party in its history on December 14 at the Book-Cadillac Hotel, Detroit, Mich. More than 475 members and guests enjoyed the dinner and a gala entertainment program arranged by T. W. Halloran, Chemical Products, Inc. The evening concluded with a drawing for 400 door prizes made possible by contributions from rubber and supplier companies. W. F. Bauer, Brown Rubber Co., was in charge of ticket sales, and the prize drawing was handled by W. J. Simpson, Chrysler Corp., V. H. Vodra, Wyandotte Chemical Corp., H. W. Neale, Pioneer Latex & Chemical Co., J. B. Craft, General Tire & Rubber Co., and E. W. Tillitson, Wayne University.

Announcement of 1952 officers was made after dinner, as follows: Chairman, G.P. Hollingsworth, Minnesota Mining & Mfg. Co. (replacing G. R. Cuthbertson, United States Rubber Co., who has been transferred to California); secretary, Mr. Simpson; assistant secretary, Mr. Neale; treasurer, E. V. Hindle, U. S. Rubber; assistant treasurer, B. M. Holmes, Ford Motor Co.; and directors, W. B. Davies, Kaiser-Frazer Corp., Mr. Halloran, G. F. Lindner, 3M, and G. M. Wolf, Sharples Chemicals, Inc.

Committee chairmen were announced as follows: program, Mr. Tillitson, assisted by J. B. Ledden, E. I. du Pont de Nemours & Co., Inc., entertainment, Mr. Bauer, assisted by R. C. Chilton, Permalastic Products Co.; publicity, J. T. O'Reilly, Ford Motor, assisted by H. Jacober, Baldwin Rubber Co.; membership, H. Hoerauf, U. S. Rubber, assisted by Mr. Craft; and educational, Mr. Vodra, assisted by E. J. Kvet, Jr., Detroit Arsenal.

Buffalo Group Celebrates

The Buffalo Rubber Group held its annual Christmas party December 18 at the Buffalo Athletic Club, Buffalo, N. Y., with some 150 members and guests attending. The celebration consisted of a cocktail hour, dinner, vaudeville entertainment, and drawing for door prizes contributed by rubber and supplier companies.

Results of the recent elections of new officers and directors of the Group for 1952 were announced, as follows: chairman, Fred Kohlhagen, Globe Woven Belting Co.; vice chairman, Ray Lowry, Hewitt-Robins, Inc.; secretary-treasurer, J. Beecher, Globe Belting; and directors, Ed Martin and Charles Johnson, both of Hewitt-Robins, and Frank J. Marocco, U. S. Rubber Reclaiming Co., Inc.

TLARGI Entertains

The largest and best Christmas party in the history of The Los Angeles Rubber Group, Inc., took place December 7 at the Los Angeles Breakfast Club, with 460 members, guests, and their wives attending. Each lady was given a compact as a table favor, and the drawing for door prizes was limited to the ladies. The party included a cocktail hour, dinner, business session, and an evening of dancing. Credit for success of the party was given to the committee in charge, including J. H. McSparran, C. P. Hall Co. of California; W. A. Fairclough, Enjay Co., Inc.; T. A. Hoyle, B. F. Goodrich Chemical Co.; B. R. Snyder, R. T. Vanderbilt Co., Inc.; and H. H. Thompson, Xylos Rubber Co.

The new officers and directors of the Group for the coming year were announced at the business session, as follows: chairman, R. L. Short, Kirkhill Rubber Co.; associate chairman, D. C. Maddy, Harwick Standard Chemical Co.; vice chairman, L. E. Budnick, Ohio Rubber Co.; secretary, R. E. Bitter, Goodrich Chemical; treasurer, F. C. Johnston, Caram Mfg. Co.; and directors, R. D. Abbott, R. D. Abbott Co., Charles Kuhn, Master Processing Corp., G. W. Miller, W. J. Voit Rubber Co., and D. M. Sheppard, Goodyear Tire & Rubber Co. Photographer, A. R. Hromatka was presented with a life membership for his service to the Group, and Mr. Abbott was given a certificate of appreciation for his work as 1951 chairman.

Ladies and Snow at Chicago

Despite a raging snowstorm, the largest attendance in the history of the Chicago Rubber Group turned out for the annual Christmas party and Ladies Night on December 14. More than 850 members and guests were present at the party, which was held in the Morrison Hotel and included a cocktail hour, dinner, program of nightclub acts, and an evening of dancing. The ladies attending were presented with silk stoles with the compliments of the Group. The committee in charge of arrangements expressed thir appreciation to the more than 150 rubber and supplier companies whose contributions made the party possible. S. M. Lillis, Victor Mfg. & Gasket Co., was chairman of this committee, with Howard Ling, Naugatuck Chemical Division, United States Rubber Co., as vice chairman. Other committee members were R. F. Anschuetz, Witco Chemical Co.; W. H. Ayscue, E. I. du Pont de Nemours & Co., Inc.; F. W. Bickel, Armour Research Foundation; R. R. Blair, Columbia-Southern Chemical Co.; M. J. O'Connor, O'Connor & Choate; and B. J. Yunker, Sirvene Division, Chicago Rawhide Mfg. Co.

Officers Named at SORG Fete

Some 246 members and their wives attended the annual winter meeting of the Southern Ohio Rubber Group on December 15, at the Miami Valley Golf Club, Dayton. The program included a cocktail hour, dinner, business session, drawing for 74 door prizes contributed by rubber and supplier companies, and an evening of dancing. Each of the ladies present was given a Koolfoam pillow through the courtesy of Dayton Rubber Co.

New Group officers and directors for 1952 were announced at the business session, as follows: chairman, Jack E. Feldman, Inland Mfg. Division, General Motors Corp.; chairman-elect, George E. Lang, Johnson Rubber Co.; secretary, Russell J. Hoskin, Inland; treasurer, Dayle R. Buchanan, Inland; and directors, (three years) Wm. L. Nolan, Inland, Harry M. Brubaker, Witco Chemical Co., and John Poffenberger, Cincinnati Rubber Mfg. Co., (two years) R. R. Hickernell, Monroe Auto Equipment Co., R. B. Appleby, E. I. du Pont de Nemours & Co., Inc., and Wm. Whittaker, Herron Bros. & Meyer, and (one year) H. S. Karch, C. P. Hall Co., Joseph Rockoff and L. J. Keyes, Dayton Rubber, and J. M. Walsh, Xylos Rubber Co.

Fielding on IRW Board

J. H. FIELDING, in charge of compounding for the Armstrong Rubber Co. plants, joined the Editorial Advisory Board of India RUBBER WORLD, January 1, replacing A. E. Juve, B. F. Goodrich Research Center, who resigned as of that date. Mr. Juve was a member of the Board since its institution in 1946.

Mr. Fielding received his bachelor's and master's degrees in chemical engineering from Massachusetts Institute of Technology in 1925 and 1926, respectively. He joined the Goodyear Tire & Rubber Co. in 1926 and held various positions with that company in connection with compounding of tires and tubes. He was manager of compound development for tires and tubes for Goodyear from 1941 until 1949, when he left to take his present

J. H. Fielding

position with the Armstrong Rubber Co., West Haven, Conn.

The new Board member has been active in the affairs of the Division of Rubber Chemistry, American Chemical Society, of which Division he was chairman in 1951. Mr. Fielding will assist the editor of India RUBBER WORLD in the field of the compounding and development of tires and tubes as well as other transportation products.

Connecticut Group Meets

THE fall meeting of the Connecticut Rubber Group was held November 30 at Rapp's Restaurant, Shelton, Conn., with approximately 90 members and guests attending. Featured speaker at the technical session was Richard Savage, General Electric Co., who discussed "Compounding and Controls in the Production of G-E Silicones." Using slides to illustrate his talk, Savage discussed the types of properties of the silicone stocks made by G-E and the compounding and curing techniques for the rubbers.

In the business session preceding the talk Chairman C. A. Larson, Whitney-Blake Mfg. Co., presented the following slate of 1952 office candidates: chairman, G. R. Sprague, Sponge Rubber Products Co.; vice chairman, F. J. Rooney, G-E, and A. Simon, H. O. Canfield Co.; secretary, G. A. Di Norscia, Sponge Rubber Products Co., and A. Panagrossi, Connecticut Hard Rubber Co.; treasurer, W. Fischer, Armstrong Rubber Co., and B. Zimmerman, R. T. Vanderbilt Co.; and directors, T. Fitzgerald, Naugatuck Chemical Division, United States Rubber Co., C. R. Haynes, Binney & Smith Co., B. Hunter, Naugatuck Chemical, and L. B. Nichols, American Brass Co.

IRI Transactions Available

TWENTY-SEVEN bound volumes of *Transactions of the Institution of the Rubber Industry*—Great Britain, in new condition, are available for purchase from B. Dunsby, 14 Highfield Dr., Chester Rd., Sutton Goldfield, Birmingham, England, according to a recent communciation from Mr. Dunsby, a fellow of the Institution.

These volumes cover the papers read before the Institution since its inception in 1925 and would be an important acquisition for a library of any large research organization or industrial firm concerned with the technical and scientific affairs of the rubber industry. Interested persons should contact Mr. Dunsby direct.

Polymer Degradation Symposium

THE mechanisms of polymer degradation were discussed at a symposium held at the National Bureau of Standards, Washington, D. C., on September 24-26, 1951, details of which have just come to hand. Sponsored by the Bureau in cooperation with the Office of Naval Research, the meeting was attended by some 200 scientists, who heard 17 papers presented by representatives of government, industry, and the universities.

The first session, under the chairmanship of G. M. Kline, of the Bureau, was concerned with the fundamental theories of degradation. H. H. G. Jellinek, University of Adelaide, Australia, presented his theories of random degradation, weak link, and preferential degradation from chain ends involving initiation, propagation, and termination steps. R. Simba, of the Bureau, showed that the photochemical and pyrolytic degradation of vinyl polymers is a complicated process which cannot in general be described by a theory of random breaking of links. A paper on "The Photochemical Degradation of Polymethyl Methacrylate," by P. R. Cowley and H. W. Melville, University of Birmingham, and read by A. R. Burgess, Imperial Chemical Industries, Ltd., England, showed this degradation to be a true depolymerization process.

The second session, under the chairmanship of B. S. Biggs, Bell Telephone Laboratories, dealt with the degradation of polyvinyl chloride-type polymers. Papers were presented on "The Effect of Heat and Light on Polyvinyl Chloride," by D. Druesedow and C. F. Gibbs, B. F. Goodrich Chemical Co., and "The Photodegradation of Polyvinyl Chloride," by A. S. Kenyon, Monsanto Chemical Co.

The third session, continuing the topic of the second, was presided over by J. B. Nichols, E. I. du Pont de Nemours & Co., Inc. A. L. Scarbrough, W. L. Kellner, and P. W. Rizzo, all of National Lead Co., reported on "The Role of Hydrogen Chloride Degradation," and C. B. Havens, Dow Chemical Co., discussed "Aging of Vinyl Chloride and Vinylidene Chloride Polymers." These papers noted that the initiation mechanism for the loss of hydrogen chloride which occurs during degradation of these polymers is not yet clearly defined. Work at the Bureau, as reported by B. G. Achhammer in the discussion period, suggests that the initiation step is caused by the breakdown of hydroperoxide in the polymer, and that the correlation usually drawn between loss of hydrogen chloride and polymer discoloration is questionable. In a paper by J. R. McCartney, du Pont polyacrylonitrile was reported to undergo rapid and large molecular weight degradation upon addition of dilute alkali to its solution. Theoretical considerations suggest the reaction mechanism to be a random chain scission of the normal polymer linkages.

The fourth session, with C. R. Stock, American Cyanamid Co., presiding, was devoted to the mechanism of oxidation of polyethylene and its stabilization. Dr. Biggs discussed "Studies on the Oxidation of Polyethylene," and Mr. Burgess spoke on "Photooxidation and Stabilization of Polyethylene." The susceptibility of this polymer to photooxidation when unprotected makes its useful life in outdoor exposure very short. Light absorbing pigments, such as carbon black, increase the life of the material by as much as 10 years or more. J. R. Shelton, Case Institute of Technology, showed the rate of oxidation of phenyl-substituted olefins to be a function of the concentrations of the peroxide and unreacted olefin contents.

The fifth session, under the chairmanship of R. B. Mesrobian, Polytechnic Institute of Brooklyn, consisted of two papers: "Breakdown in Cellulose Ester Systems by Heat and Light," by G. C. DeCroes and J. W. Tamblyn, Tennessee Eastman Co.; and "Oxidative Degradation of Ethyl Cellulose," by L. F. McBurney, Hercules Powder Co. Emphasis was placed on the oxidation mechanisms of the cellulosic polymers. Apparently, the primary attack by oxygen forms hydroperoxide, and the secondary reactions, such as those causing a drop in viscosity, result from the hydroperoxide decomposition.

The sixth and final session, with Warren Stubblebine, Office of the Quartermaster General, in the chair, summed up the research on degration mechanisms at NBS. S. L. Madorsky dealt with the rates of thermal degradation of polystyrene and polyethylene obtained by measuring loss in weight of samples with a sensitive tungsten spring balance enclosed in a vacuum. Results indicate the polystyrene degradation process is intermediate between a zero- and first-order reaction; while the polyethyylene process resembles a first-order reaction. L. A. Wall described the pyrolyis of copolymers such as styrene-butadiene, styrene-isoprene, and methyl methacrylate-isoprene. Mr. Achhammer, who treated of the degradation of polstyrene by heat and ultra-violet radiant energy, showed that this process involves two different reactions: (1) breakdown of thermolabile groups formed in the polymer prior to degradative treatment; and (2) oxidation of the polymer. The mechanism of the degradation of polyamides was reported by F. W. Reinhart as consisting of the following three steps: (1) breaking of the polymer molecules at the C-N bond of the peptide group; (2) changes in the degree of crystallinity or local order; and (3) changes in the amount of strongly bound water, organic liquids, or both.

In summation, the conference demonstrated the progress that has been made over the past few years in elucidating the structure of polymers and the mechanisms of their breakdown. The Bureau plans to publish the proceedings together with discussions and submitted comments.

Reclaim Rubber Symposium

THE Akron Rubber Group will hold its fifth annual mid-winter symposium on February 1 at the Mayflower Hotel Akron, O. "Reclaim—Processes and Uses" will be the subject of the discussion. Members of the panel will be William P. Boyd, Xylos Rubber Co.; Earl B. Busenberg, B. F. Goodrich Co.; Ted A. Johnson, Goodyear Tire & Rubber Co.; Jean H. Nesbit, U. S. Rubber Reclaiming Co.; and William Welch, Midwest Rubber Reclaiming Co. The afternoon technical session will be followed by a social hour, dinner, and entertainment program.

McPherson, Kline Promoted

A. T. McPHERSON has been appointed associate director of the National Bureau of Standards, Washington, D. C.; while Gordon M. Kline has been appointed chief of the Bureau's Organic and Fibrous

(*Continued on page* 474)

NEWS of the MONTH

M-2 Revision Removes GR-S Use Restriction, Provides for More Tire Production; High Level Production Predicted for 1952

The National Production Authority, in its revision of Rubber Order M-2, effective January 1, removed restrictions on new rubber consumption, raised tire production levels, and authorized the manufacture of second-line tires. Consumption of natural rubber and butyl rubber are still limited, however, the former by end-product specifications, and the latter by base-period allocations. Natural rubber consumption was set at 105,000 long tons for each of the first two quarters, with some possibility of higher consumption during the second half of the current year.

The need of a program to permit rubber goods manufacturers higher priorities in securing rubber processing machinery was pointed out by the NPA's Rubber Processing Machinery Industry Advisory Committee. Rubber processing machinery producers are "drifting, or being forced into fields outside of the regular types of production," it was also claimed by the committee.

W. Stuart Symington, RFC Administrator, paid tribute to the government-industry synthetic rubber industry and suggested the possibility of lower synthetic rubber prices. A new general-purpose vinyl toluene-butadiene copolymer was announced.

The problems of the rubber goods manufacturer in considering the purchase of government-owned synthetic rubber plants, when and if such purchase is permitted, were outlined by John T. Cox, Jr., consulting chemical engineer. The elimination of the continuing shortage of petroleum butadiene is a major problem in the future of GR-S type of synthetic rubber, whether produced by government or industry. Improved supplies of acrylonitrile should mean more nitrile-type rubber in 1952, it was said.

The government is authorizing the export of 10,000 tons of GR-S during the first quarter of 1952.

The Rubber Manufacturers Association, Inc., predicts that 1952 will set a new record for new rubber consumption in the United States at about 1,300,000 long tons, 65% of which will be synthetic rubber. With the natural rubber stockpile target now in sight and with synthetic rubber firmly established in a large and enduring section of the U. S. market, new legislation on rubber in 1952 will be examined in the light of these new facts. Disposal of synthetic rubber plants and practically complete decontrol of the industry in 1953 were considered possible.

Statements by other rubber industry leaders followed the general tenor of the year-end report of the Rubber Manufacturers Association.

Lee R. Jackson, president of the Firestone Tire & Rubber Co., predicted that tire demand and supply would reach a level of 110,000,000 units in 1955, about 20% above the 1951 figure.

Seiberling Rubber Co. and General Tire & Rubber Co. joined the Big Four in granting wage increases of 13¢ an hour.

Washington Report

By

ARTHUR J. KRAFT

NPA Relaxes Controls

NPA took the lid off total new rubber consumption as a New Year's present to the rubber industry. Effective January 1, the agency removed from M-2 the long-standing restrictions limiting consumption of GR-S and the more recent restrictions limiting rubber consumption in the production of passenger-car tires and tubes and several other "less essential" products, as set forth in Appendix B of the order.

The latest M-2 order, however, will continue to limit consumption of natural rubber and butyl, the former through application of the Appendix A end-product specifications, and the latter through base-period allocations.

Other restrictions remaining in force include inventory limitations of 30 days on manufacturers' stocks of GR-S and butyl and of 60 days for natural rubber. Further to assure orderly distribution of GR-S, the regulation restricts sales to regular consumers for their own use or resale to bona-fide manufacturers, or to those holding validated export licenses issued by the Office of International Trade. In addition, no purchaser may take more than 46% of his monthly purchases in the form of cold GR-S.

The Appendix A specifications were changed in some instances either to increase slightly the permitted natural rubber content or decrease the maximum permitted percentages.The principal modifications were decreases from 15 to 14% for small passenger-car tires; 22 to 20% for large passenger-car tires; 38 to 35% for truck tires; 75 to 70% for sizes 8.25 to 9.00; and 90 to 88% for sizes 10.00 through 12.00.

The revised order also provides for eventual private importation of natural rubber latex. Provided the General Services Administration liquidates its holdings by that date, private importation may begin after March 31. Even then, however, importers must get special authorization from GSA to bring in foreign latex.

Hailing the partial decontrol as a "significant achievement," NPA said the action was due chiefly to increased output of synthetics and to the general improvement in inventories of finished rubber products. The agency estimated first-quarter 1952 GR-S output at 202,000 long tons (67,000 tons a month) and noted that GR-S inventories at the end of the year would approximate 99,400 tons, more than double the amount held nine months earlier.

The normal inventory requirement for 1952 of GR-S was estimated at 90,000 tons, of which 65,000 tons represent a 30-day consumption by industry, and the balance RFC's operating requirements. Inventories, NPA said, would increase beyond requirements were the lid maintained on GR-S usage.

NPA reported that from April 1 to November 1, passenger-car tire inventories rose from 2,100,000 to 4,322,000 units; truck tires from 700,000 to 1,200,000; farm tires from 300,000 to 500,000; and camelback from 2,300,000 long tons to 5,400,000 long tons. The increase in passenger-car tire stocks was in keeping with reduced output of automobiles; while the increase in other-type tire inventories was spurred to some degree by special efforts made through M-2 to increase their output. The inventory position for other rubber goods also improved.

NPA said it intends to keep natural rubber consumption to a quarterly rate of about 105,000 long tons at least through the first half of 1952. Officials informed the industry that the ban on manufacturing a white sidewall tire probably will be retained at least until July because of the need of conserving natural rubber.

Despite a flurry of questions intended to elicit the agency's view on the sale of white sidewalls not requiring natural rubber, officials told the rubber industry advisory committee early in December that the revised order prohibits only their manufacture in this country. It does not prohibit dealers from "painting" a white sidewall on a conventional black tire, nor does it prohibit the importation of white sidewalls.

Agency officials, however, made it clear that unofficially they frown on the introduction of a white sidewall of any type at this time and possibly, if the situation threatens to get out of hand, may ammend M-2 to extend the prohibition to dealers and other non-manufacturers. As far as it could be determined, tire manufacturers are not of one mind on the white sidewall question. Automobile manufacturers, on the other hand, are reported strong for removal of the white sidewall ban. They and their dealers want the tire as original equipment in the belief that it may help stimulate lagging sales of new cars which have been stripped by shortages of much of their flashy chromium.

With the lid off total new rubber consumption, the manufacturing industry is looking forward to consuming about 1,300,000 long tons in 1952. Military orders, now taking about 10% of current usage, are not expected to increase their take substantially until summer.

The only specific production plans announced by the industry as the direct result of the partial decontrol of rubber are production of a second-line passenger-car tire to be sold at prices lower than those charged for the first-line tire which manufacturers have concentrated on as long as production was restricted by M-2 to a single line. The new order sets no limit on the number of lines which may be produced.

Office of Price Stabilization officials said in mid-December that they plan shortly to confer with tire manufacturers on pricing the proposed second-line tire. Among other things, the agency will seek more specific information on the industry's plans, such as how many companies plan to make a second-line tire. Informally, OPS said it was gratified by the announced intention of several tire companies to produce a cheaper-line tire.

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FF (Fine Furnace)
STATEX-B

◆

FEF (Fast Extruding Furnace)
STATEX-M

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On the white sidewall issue, the services branch of the OPS consumer goods division was looking into the prices being charged by dealers who recently began selling the "painted" white sidewall. Such sales would be governed by CPR 34, the agency's omnibus services ceiling price regulation. In mid-December, OPS launched an investigation of the complaint that the prices charged for this service in some cases, at least, were "excessive." Officials said, however, they did not yet have sufficient data to arrive at any conclusions. OPS did not disclose the source of the complaints, but it was indicated that these came from various purchasers or prospective purchasers.

NPA Suspensions

NPA took action in December against two rubber companies for consuming more new rubber than permitted under M-2. In each case the respondents admitted the charges at public hearings conducted by NPA hearing commissioners.

A temporary suspension order was issued November 29 directing Pacific Tire & Rubber Co. immediately to halt any further consumption of new rubber. On December 4, after a public hearing, the agency formalized this order by withdrawing allotments, allocations, and priority assistance from the company until January 1. The order specifically prohibited Pacific Tire from consuming new rubber or any other material under NPA control during December. It also instructed the company to cancel unshipped orders for materials or products scheduled for December delivery, which are subject to NPA priorities and allocations.

The company was specifically charged with the unauthorized consumption of more than 600,000 pounds of new rubber between March and September 30, 1951. The formal statement of charges noted that at least 459,577 pounds of this unauthorized usage went into the production of about one million dollars worth of automobile tires.

On December 4, also, the agency issued a similar suspension order against Armstrong Rubber Co., and three affiliates, directing them to reduce their consumption of new rubber by 920,084 pounds during December. The respondents admitted using 9,777,083 pounds in making automobile tires in the third quarter, or 920,084 pounds more than authorized to use. The illegal consumption was enough to make some 92,000 tires, NPA said.

The three affiliates were Armstrong Tire & Rubber Co., Natchez, Miss.; Armstrong Rubber Co., Des Moines, Iowa; and Armstrong-Norwalk Rubber Corp., Norwalk, Conn. NPA pointed out that the violations in the case of the four Armstrong companies were not deliberate, but were occasioned, rather, by "erroneous interpretation" of NPA regulations.

Rubber Legislation

The White House report to Congress by mid-January on disposing of the government's synthetic rubber plants and other aspects of national rubber policy is considered in Washington to be in the form of a recommendation for a one-year extension of the present law with no changes. The current rubber act expires June 30.

On the other hand, it seems at least possible that the Administration will suggest, along with a flat extension, a specific directive to make a serious effort to draw up a plan for disposing of the synthetic rubber plants and a report on this subject to Congress within or at the end of 12 months. RFC has been working on this job for several months and may be expected to carry it on, with its new rubber director, Leland Spencer, taking an important role.

The idea of asking Congress for authority to dispose of butyl facilities, if presented, is not expected to make much headway. The Administration, however, is reported by usually well-informed sources to have decided to ask Congress for authority and funds to erect additional butyl facilities, perhaps to the extent of some 40,000 tons a year additional capacity to be added to the present 85,000-ton capacity.

One prospect of the entry into butyl production by a private group, under active consideration early in December, fell flat when the parties to the proposal failed to agree on internal arrangements. They were reported to be contemplating the erection and operation of a butyl plant with an annual capacity of 20,000 tons, privately financed, but with generous rapid tax amortization from the government.

There was no certainty in late December that the Senate or House Armed Services Committees would bother to conduct hearings on extension of the Rubber Act. Should such hearings be held, they may come late in the spring.

The RMA Crude Rubber Committee, in mid-December, wrote to Jess Larson, General Services Administrator, calling for a gradual restoration of private buying of dry natural rubber to begin in May or June. Larson had not replied by late December, but it seemed unlikely that he would look with favor upon the RMA proposal. The RMA pinned its request to achievement of the so-called "peril point" in the rubber stockpiling program by the end of March.

The "peril point" is the point at which enough rubber would be in the stockpile, or en route, plus that in industry's hands, to carry the nation through five years of war, given strict conservation measures. This point is somewhat shy of the stockpile target, perhaps by some 300,000 tons.

With the "peril point" reached, the industry feels that the government could well afford to slow down the rate of stockpile buying, either confining purchases to the quantity needed for rotation or to rotation plus small, steady additions to the stockpile. There has been no indication, however, that the military or other government authorities as yet feel sympathetic to the idea of slowing the stockpile acquisition rate at any point short of attainment of the full target.

Since it may be expected that industry will continue to plead for a slowdown in the pace of stockpiling, the government's attitude may be conditioned by the degree of moderation shown by manufacturers in their use of natural rubber during the last 1951 quarter. Usage is being checked now only by Appendix A specifications of M-2 and theoretically could breach the ceiling which NPA wants the industry to abide by since there are no longer any limits on unit production of tires or anything else. The industry is well aware that NPA expects it to conform voluntarily to the ceiling of 105,000 tons a quarter, including natural rubber latex.

NPA Rubber Machinery Committee

The workings of the government's system of priority-rated orders and the still relatively small volume of defense contracts placed with the rubber goods industry threaten the industry with a dearth of processing machinery in another year or so, the NPA was told by its Rubber Processing Machinery Industry Advisory Committee at a meeting on October 25.

The machinery industry committee said that present priority regulations, and the high demand for machinery, are forcing that industry to meet a rising volume of direct military orders from companies not in the rubber products field. Meanwhile their traditional customers, the rubber goods manufacturing industry, simply do not have enough priority-rated orders to compete for new processing machinery and will face serious trouble unless the trend is arrested, the committee warned. As things now stand, the rubber processing machinery producers are "drifting, or being forced, into fields outside of their regular types of production."

The ubiquitous "DO" rating seems to be the source of the difficulty. NPA's Stanley C. Compher, the presiding officer at the meeting, told the committee that "there is no reason to require a customer to furnish a 'DO' rating on an order unless it is needed in operation. If everyone had a 'DO' rating," he added, "the situation would be the same as if there were no ratings." A banded priority rating system (multiple priority levels) would then be required, he warned. Compher, an official of the General Industrial Equipment Division of NPA, noted that "DO" orders must be given *preference in scheduling production*, after several committee members reported that many rubber goods manufacturers, wishing to buy machinery without a "DO" order are told that their order will be accepted, *but not scheduled for production* until a rating can be certified.

The machinery producers said that about 60% of their present orders carry "DO" ratings; 35 to 40% are for maintenance, repair, and operations; 15% are for direct defense; and 8 to 10% are for export.

The rubber products industry is unable to get ratings because it has not yet received a large amount of direct defense business, an industry representative stated. On the direct defense orders they have received, the rubber companies can use the same primary processing equipment they use for passenger-car tires. For finishing operations in vulcanizing or building large tires, however, producers have requested and received ratings, he added.

Benjamin Middleton, of NPA's Rubber Division, said that most rubber companies come to NPA for spot assistance on acquiring machinery and, when the case warrants, are given a rating. He noted, however, that no final decision has been made as to a definite program to keep the rubber goods manufacturing industry supplied with necessary processing machinery. In reply to a specific question, Compher said that truck tires are considered defense-supporting rather than direct defense items, thus placing them on the lowest priority scale.

One committee member, whose company manufactures rubber products, emphasized the need of formulating a program for the rubber industry. Although his company is having only slight difficulty in securing repair parts at this time, pressure is increasing, and in a year's time, he said, the situation will be critical. Equipment is wearing out rapidly. Rubber processing machinery producers will have changed their production pattern to direct defense, and equipment will not be available to the rubber industry, he feared. Six months, he predicted, would be needed to reconvert to the regular line of rubber processing machinery.

W. E. Fitch, of NPA's Aluminum & Magnesium Division, said aluminum will be in very short supply in the first half of 1952, but will improve substantially beginning in the third quarter. NPA, he said, is trying to find some means of allow-

ing the rubber industry and several other essential industries to recast their aluminum scrap without permitting the practice to become general.. In the case of rubber processing machinery, he said, many broken molds could be recast and returned to use were this practice permitted. The practice is prohibited under current regulations to prevent non-essential industries from absorbing vitally needed scrap.

Committee members reported that little has been done on standardization throughout the industry. They pointed out, however, that materials could be conserved if the rubber tire industry would avoid making slight changes in tire design which require the use of new tools and dies by the rubber processing machinery producers. The radical change-over to low pressure tires in 1947 and 1948, they said, is now being felt in the repair and recapping segment of the industry, as tires made during these years are now worn smooth and in need of repair. Since construction of tires varies so widely among companies, standardization of the tire would mean revamping the entire art of tire-making, one company official said. One company, making tire recapping machinery, said it now is refusing to make new tread designs for civilian tires if the designs require new tools and dies.

The committee members, returning to the major problem before the meeting, agreed they should ask the help of the RMA in presenting to NPA a brief highlighting the importance of the rubber goods industry to the defense economy in order to call attention to the need of a definite program recognizing the industry's need of machinery. Such a program is very much needed, it was said, to check the current drifting away of rubber processing machinery companies from their normal type of production. The next meeting of the committee was set for January 16.

The members of the NPA Rubber Processing Machinery Industry Advisory Committee are: Walter Voth, Akron Standard Mold Co.; Sydney L. Albert, L. Albert & Son; Jack Herzig, Bacon Vulcanizer Co.; J. R. Keller, Black Rock Mfg. Co.; Donald Comes, Farrel-Birmingham Co., Inc.; W. Keith Gammeter, W. F. Gammeter Co.; Boyd R. Hopkins, Girdler Corp.; S. E. Grimes, Grimes Co.; J. H. Fitch, McNeil Machine & Engineering Co.; D. D. Cooper, National Industries; A. L. Heston, National Rubber Machinery Co.; Justin H. Ramsey, John Royle & Sons; Norton C. Wheeler, Standard Machinery Co.; and C. A. Ostling, United States Rubber Co.

Rayon Shortage

Only about two-thirds of the rubber industry's requirements for high-tenacity rayon yarn are now being furnished, the Rayon Yarn Industry Advisory Committee informed the NPA on November 15. The committee members pointed this condition out in protesting a proposed order which will reduce sulfuric acid and carbon disulfide consumption by each rayon yarn plant to 90% of 1950 usage, beginning in 1952.

The shortage of high-tenacity rayon yarn, according to the latest data, is likely to persist during the next two years. Toward the end of that period new plants are expected to take up the considerable gap between supply and demand. Thus far, only two plants have been granted rapid tax amortization. Construction of one of these is well under way; the other has been slow getting started.

Holding up approval of the quick tax write-off on a number of other projected high-tenacity rayon yarn plants was their involvement, along with new synthetic fiber plants in general, in what is known around Washington as "cotton politics." The always alert and active Congressional "cotton bloc" protested some months ago when rumor had it that Defense Mobilizer C. Wilson would support a vast construction program in the synthetic fiber field. Under pressure from the cotton states' legislators, Wilson later denied he had such a plan, and special government aid, such as the rapid tax write-off, was held up for synthetic fiber projects until recently.

The rayon yarn producers regard rapid tax amortization as a necessary prerequisite to construction of new plants, contending that future expansion will entail costlier production.

Symington on Synthetic Rubber

RFC Administrator Symington said last month that the synthetic rubber program, a "joint enterprise" of government and industry, "presents large savings for the taxpayer and consumer" and promises soon to make this country "self-sufficient as to rubber." He added that lower prices for synthetic are in store for the future.

Symington made the statement in the course of a prepared address on "New Concepts of the RFC" delivered before the National Credit Conference of the American Bankers Association in Chicago on December 4. Speaking of the rubber program, Symington said:

"The American taxpayer's investment in the synthetic rubber industry is around three-quarters of a billion dollars. All of these plants are operated by private industry, and sales of the rubber, at cost, are now running over a million dollars a day. In this joint enterprise government and industry have developed a synthetic rubber which is now superior to natural rubber for most purposes, the main exceptions being heavy-duty tires and a few surgical goods products. Synthetic will soon fill those needs also and thereupon the United States will be self-sufficient as to rubber, a far cry from where we found ourselves the day after Pearl Harbor. This program also represents large savings for the taxpayer and consumer. America travels to work on rubber. Synthetic rubber has been selling at about half the price of natural, and the price of synthetic is sure to be reduced further in the future."

Vinyl Toluene Copolymer

The RFC announced November 30 that the Goodyear Tire & Rubber Co. is experimenting with commercial production of synthetic rubbber, using vinyl toluene as a substitute for styrene in combination with butadiene.

The agency said that government fleet tests have demonstrated that tires made from vinyl-toluene-butadiene rubber showed normal roadwear performance. Goodyear has been producing the new copolymer on a pilot-plant basis, and the experiments have been conducted in cooperation with the RFC.

Vinyl toluene is now being made in a pilot-plant of the Dow Chemical Co.; and large-scale production is expected to start about the end of 1952.

Synthetic Rubber Outlook

John T. Cox, Jr., consulting chemical engineer, writing in *Natural Rubber News* for December on "Synthetic Rubber," makes reference to the report being prepared by RFC for submission to Congress in mid-January on the disposal of the government-owned synthetic rubber plants. He adds that although RFC Administrator Symington has expressed the opinion that the government should get out of the rubber business, there are many powerful opponents as well as proponents of such a plan.

Dr. Cox points out that the attitude of the rubber industry itself is not known with finality. The industry wants to know what the synthetic rubber raw material picture will be, what the price will be, and what will the supply hold for the future. The prospect of immediate control of the fabricating industry's basic raw material, synthetic rubber, is most attractive, however, and on this prospect the question of private ownership is being kept alive.

Of the total planned GR-S capacity for 1952 of 860,000 long tons, 75%, or 640,000 tons, will be available as cold rubber capacity by the first quarter of 1952. Butyl rubber capacity is expected shortly to approach 90,000 tons a year.

High Mooney viscosity oil masterbatched GR-S has been successfully used to make complete tires which gave excellent performance, and there appears to be no reason for not using these rubbers in carcass stocks as well as in tread stocks.

Another new development is the incorporation of oil into a butadiene-styrene polymer in the presence of alfin catalysts. These high-viscosity polymers are by this means apparently changed to give workable, potentially low-priced polymers.

Dr. Cox estimated GR-S production for 1951 at 698,527 long tons, butyl at 73,105 tons, nitrile types at 15,879 tons, and neoprene production at 133,375,000 pounds.

Butadiene is still in short supply, but a new catalyst for the petroleum produced material is expected to improve this situation. The demand for the more expensive alcohol-butadiene may then diminish to some degree.

Acrylonitrile will be in much better supply during 1952, and this will improve the production of nitrile type rubbers to a great extent. The rest of the raw materials, emulsifiers, antioxidants and catalysts, appear to be in fair supply, and no trouble is expected from this quarter.

GR-S Export

OIT announced November 28 that it expects to authorize exports of "limited quantities" of GR-S beginning in the first quarter of 1952. The disclosure was made at its first meeting with an 11-member Synthetic Rubber Export Advisory Committee.

While the announcement mentioned no specific tonnage, it is reported that the first-quarter allocation will provide about 10,000 long tons for export. The agency said an export allocation will be set up for shipments to "friendly countries."

OIT said that as things stand now, U. S. stocks of GR-S should be large enough to permit small-scale exports to meet special technological needs that cannot be met by natural rubber; prevent disruptions that would result from conversion to natural rubber by established users of synthetic rubbers; and contribute to U. S. national security. Exports also, it said, would "permit sustained production of GR-S rubber in the United States, and would lessen the drain on stocks of natural rubber in friendly areas."

Indications are, the agency noted, that the first-quarter export allocation "will be considerably below demands." OIT would license all exports. RFC will sell the rubber to exporters at the same price as it sells to domestic users.

The industry committee suggested that each importing country be assigned a percentage of the total allocation based on its consumption of natural rubber in a recent year. It would be impossible, the committee contended, to establish an equitable allocation using each country's consumption of synthetics as a base, since overseas usage of synthetics is too recent a development to have shown already a normal pattern.

The committee also suggested that GR-S be licensed for export only to actual users —foreign subsidiaries of American companies and foreign manufacturers—holding import permits or other authorizations from their respective governments. Such procedure would best assure that the American-made GR-S is channeled into the "most essential uses abroad."

F. D. Hockersmith, director of OIT's Finished Products Division, presided at the meeting, attended by the following industry members: S. E. Brennan, H. Muehlstein & Co., Inc.; R. C. Cooke, Caswell Industrial Co.; B. M. Costello, International B. F. Goodrich Co.; Alexander Daignault, Dewey & Almy Chemical Co.; G. K. Hinshaw, Goodyear; J. K. McElligott, A. Schulman, Inc.; A. S. Pawling, Dayton Rubber Co.; Harold E. Poel, H. A. Astlett & Co.; C. A. Polachi, Binney & Smith International; F. J. Reighley, Firestone; and H. W. Rolph, General Tire & Rubber Export Co.

The OIT announced December 20 that it had established the quota of 10,000 long tons of GR-S and that applications for export licenses must be submitted by January 7. Officials said they planned no definite country-by-country quotas and will strive to parcel out the limited exportable tonnage among as many countries as possible.

In licensing against the first-quarter quota, which is large enough to meet only essential end-uses, OIT will give consideration to applications covering shipments that will: (1) meet special technological needs that cannot be met by natural rubber; (2) prevent disruptions that would result from conversion to natural rubber by established users of synthetic rubber abroad; (3) contribute to U. S. national security.

OIT expects to complete its screening of license applications about mid-January and issue the licenses about January 20. The rubber should start arriving at overseas factories toward the end of February.

"Current Export Bulletin 651" details the procedure for applying for export licenses. The standard license application form, IT-419, will be used, which requires detailed information of the end-use of the proposed shipments, including an estimate of the rate at which the consignee will use the rubber. If the shipment is financed by ECA, this fact should be noted.

Receipt of a validated export license from OIT, authorizing shipment of a specified quantity of GR-S, will entitle the licensee to apply to the Sales Section, Synthetic Rubber Division, RFC, for a permit to buy that quantity from an RFC plant. In requesting this permit, the licensee must furnish RFC with the number and issuance date of his export license. RFC will sell to exporters at 26¢ a pound, f.o.b. plant, the same price charged for domestic sales. If a heavier bag is used for export shipments, a slight additional charge may be made.

Private-Brand Tire Discounts

OPS amended its order governing the prices of private-brand tires and tubes during December to authorize manufacturers' sales to private-brand owners on the basis of specified percentage discounts from the prices manufacturers get for their own brands.

The action, Amendment 1 to CPR 62, was effective December 17 and now sets forth the following methods of pricing such sales: (1) fixed price per tire or tube; (2) aggregate pricing; (3) freeze of pre-Korea cost-plus contracts; and (4) ceilings of manufacturer's own brand less specified percentage discounts.

The fourth method was permitted after OPS learned that this is being used in some instances. OPS will authorize use of this method, subject to approval on application by manufacturers who sold to private-brand owners on this basis during the first half of 1950.

The discounts granted, OPS said, are designed to recompense private-brand owners for the costs and risks of promotion and distribution which a manufacturer would incur in selling his own brand.

The amendment also provides for sales by certain private-brand owners to their own outlets on the basis of cost-plus contracts if such existed during the first half of 1950 and are filed with and approved by OPS. The agency cited sales by purchasing cooperatives to affiliated or controlled outlets as an example of the sales covered by this provision.

Another provision removes from the coverage of CPR 62 private-brand tires and tubes sold as original equipment for industrial trucks, sulkies, bicycles, lawn mowers, and similar equipment. For the time being, such original equipment will be priced under the General Ceiling Price Regulation, but later will be covered by a special original equipment order, OPS said.

Camelback Prices

At a meeting held December 12, the OPS told its Camelback & Tire Repair Materials Industry Advisory Committee that it planned to roll back the industry's prices by 4% to 14% below the ceiling prices existing since last January, which are generally identical with actual prices.

The agency said the rollback would become effective December 19, when camelback and tire repair material producers are to begin pricing under CPR 22, which permits limited rollbacks to account for cost decreases, as well as increases for higher costs.

The rollbacks are tied, OPS said, to the decrease made July 1 in the price of natural rubber of 14¢ a pound. The industry committee protested, and OPS admitted, that the agency failed to take account of the cost increase of 1.5¢ a pound made by the RFC on September 1 in the selling price of GR-S. The cost of raw material, it noted, is the chief cost factor for the industry's products.

The committee said it would find pricing under CPR 22 satisfactory, provided it is permitted to reflect the higher price of GR-S in its ceilings, or were RFC to reduce its selling price back to the pre-September level of 24.5¢ a pound. Some members warned of inferior-quality camelback should the full rollback stick.

The committee said it would be satisfied also to continue under the GCPR, which fixed ceilings at last January's level. In other words, industry would forget about the higher GR-S price if OPS forgets about the lower natural rubber price.

Agreeing only to take these representations under consideration, OPS pointed out that the rubber industry "has enjoyed the benefit of a substantial reduction in the price of natural rubber and increased production of synthetic rubber available at a cost much lower than that of natural rubber."

The GCPR ceilings were fixed January 26, 1951, to reflect the highest price at which camelback sales were made in the preceding six weeks. In this period, natural was selling at about 70¢ a pound, and GR-S at 24.5¢.

ECA-Firestone Guarantee

The Economic Cooperation Administration has provided the Firestone company with the first twofold guarantee ever accorded an American company investing in a foreign enterprise, the agency announced December 4.

Under a contract between ECA and Firestone, the company's investment in the German manufacturing concern known as "Phoenix" will be guaranteed against loss through confiscation or expropriation. The contract also assures Firestone that its earnings through the German association will never be completely blocked through inability to convert marks into dollars.

ECA disclosed that Firestone has entered into an agreement with Harburger Gummiwaren-Fabrik Phoenix A.G. Popularly known as "Phoenix," the company is one of Europe's leading rubber products manufacturers. The agreement between the two companies stipulates that Firestone will obtain a minority stock interest in Phoenix while the latter, with assistance from Firestone, will manufacture in Germany tires, tubes, and other rubber goods similar in quality to those produced in America by Firestone. "Phoenix" will be entitled to use the name "Firestone-Phoenix" on such products. Firestone's investment will include technical assistance and may also consist of certain machinery and equipment needed to produce rubber items meeting with Firestone's specifications. Most of this equipment, however, can be made in Germany.

Under its contract with ECA, Firestone is protected for convertibility of German currency up to $1,841,700 and against loss by expropriation or confiscation up to $1,052,400. A precedent-setting provision for such ECA guarantees is a provision assuring Firestone that it can convert its receipts at any time at a rate not less favorable than 61% of the official rate at that time. The percentage is based on the recent relation between the rate for transfer of German investment receipts and the so-called official rate of the Bank Deutscher Laender. This ECA contract provision provides broader protection than heretofore available under circumstances where conversion of receipts from investment can be made only at a discount from the general run of exchange transactions.

While ECA has entered into investment guarantee contracts with other firms, this contract is the first covering an investment primarily in the form of stock received for a contribution of patents, processes, and techniques.

—A.J.K.

Outlook for 1952

RMA Year-End Statement

Controls worked out jointly by industry and government subjected rubber goods manufacturers in 1951 to the most severe restrictions in their peacetime history, but despite this fact the industry was able to meet all military and civilian requirements, RMA said in its year-end statement. In the process the industry used a near record 1,235,000 long tons of new rubber.

An amazingly quick reactivation of the government-owned, industry-operated syn-

thetic rubber plants provided more than three quarters of a million tons of new synthetic rubber for the rubber goods production lines and enabled the industry to bridge the gap between the supply of natural rubber and the demand.

The teamwork in this operation and in the controls program put the industry and the government by the year's end well on the way to achieving the twin objectives of building the stockpile to security level and meeting all military and civilian demand for rubber goods. Increasing supplies enabled the government to move twice, in August and December, to ease restrictions. The relaxation of controls reflected the easier supply and gave recognition to the high priority position that rubber holds in the economy, it was said.

Still further relaxation of controls is scheduled in 1952 as the industry enters the new year with estimates that consumption may exceed by a substantial margin usage in 1951, a year in which the gross value of rubber products was estimated at five billion dollars.

Tire production in 1951 as compared with 1950 is shown below:

	1951	1950
Passenger-car tires	66,000,000	78,598,174
Truck and bus tires	17,600,000	14,155,842

Faced with increasing military requirements, the industry is equipped to supply that demand as well as all civilian needs, short of an all-out war. It is estimated that new rubber consumption in 1952 will reach an all-time record of 1,336,000 long tons. The previous record year was 1950, when 1,258,557 tons were consumed.

The RMA projects 1952 consumption (in long tons), as compared with the two preceding years, as follows:

	1950	1951†	1952†
Synthetic	538,000	775,000	871,000
Natural	720,000	460,000	*465,000
Total	1,258,000	1,235,000	1,336,000

*Including 420,000 tons dry natural, balance latex.
†Estimated.

Demand for the so-called cold type of GR-S continued to gain at a faster rate than production facilities could be expanded in 1951. Another development in the synthetic rubber field having great promise is the introduction of oil-extended synthetic rubbers. These rubbers appear to have great value in extending the nation's total supply of rubber, and at the same time they provide a high-quality material easier to process. The industry has now had experience with more than 690 different types of synthetic rubber polymers. New ones appear each month, with many finding special application in products where they have proved superior to any other materials available to the industry.

Consumption of synthetic rubbers, which have established their superiority over competitive materials in literally thousands of different products, was divided as follows: GR-S, 640,000 long tons, up 53.8%; butyl, 72,000 tons, up 8.5%; neoprene, 50,000 long tons, up 14.2%; and nitrile-type rubbers, 13,00 long tons, up 9%. The 1951 production of these rubbers was estimated to be: GR-S, 700,000 long tons; butyl, 74,000 tons; special-purpose rubbers, 74,000 tons.

Although the exact total of the natural rubber stockpile objective is not public, it is expected that it will be achieved in 1952, the RMA said. A termination of the government's program of exclusive purchase of natural rubber and a return to manufacturers' private purchase rights denied them since December 29, 1950, was called for.

Rubber becomes a legislative problem again in 1952, with the expiration of the Rubber Act of 1950 on June 30, 1952. Never completely decontrolled since World War II, the industry faces legislative debate of the problem under new circumstances in 1952. Chief block heretofore to disposal of the government-owned synthetic plants has been insistence on the need of retaining them until the security stockpile has been achieved and the need of assuring minimum synthetic rubber consumption through use requirements, the RMA pointed out.

With the stockpile target now in sight and synthetic rubber having staked its claim to a large and enduring section of the U. S. market, legislation will be studied in light of these facts. Both the administration and the industry will be called upon to make recommendations. Indications are that because of the Korean situation and the urgency of the defense program, recommendation may be forthcoming for a one-year extension of the present law. Such action would provide an additional 12 months for the working out of a disposal program that might be put into operation in 1953.

Rubber industry employment averaged 220,000 clockcard workers in 1951, somewhat above the level of the year preceding. As a result, the industry faces a year of rising military production with its highly skilled labor force nearly intact. Average hourly earnings steadily increased, and tire and tube workers reached a rate of more than $2 an hour in July. Subsequent increases were later granted by the Wage Stabilization Board.

A high level of rubber consumption was achieved by some 800 manufacturers of mechanical rubber goods. Producing between 30,000 and 35,000 different items, many of these companies, particularly in the field of molded and extruded goods, are concentrated in centers of automobile, washing machine, radio, television, refrigerator, and machine tool production.

Manufacturers of conveyer belting, transmission belting, and hose had a year of high production. Bookings fell off in the latter half of 1951, but the substantial back-order position of the industry kept manufacturing operations at a high level.

Production of latex foam products and rubber thread was off from that of the previous year. As for latex foam production, this decline was due in part to the extremely high price of natural rubber latex. In the case of thread, a tremendous amount of anticipatory buying had taken place in the latter part of 1950 and early 1951.

V-belt production continued its steady growth, the item finding broad new markets as a medium of efficient transmission of energy.

Although a succession of mild winters in populous areas of the country has had a depressing influence on the waterproof rubber footwear industry, production and shipments during 1951 showed a substantial increase over 1950 figures. Severe early snowstorms in the Great Lakes area and the Midwest moved retailers inventories and noticeably firmed demand for protective rubber footwear. Production and sales of rubber soled canvas footwear were slightly higher than in 1950.

Rubber flooring production and sales were somewhat below the level of the 93,800,000 square feet reported in 1950. This situation was due in part to government restrictions on the use of rubber for end-products of the flooring manufacturers, and restrictions on new contractors.

Some products in the rubber sundries field showed substantial increases in both production and sales; while others held at 1950 levels or declined. Higher production of more essential items like hospital equipment and industrial gloves reflected some of the controls placed on this branch of the industry.

Producers of rubber coated materials chalked up a 10% gain, yardage-wise, over 1950 business. Their production covers both coated and combined fabrics, using synthetic and natural rubbers as coating media. The military, a large consumer, figures to take even greater yardage in 1952.

The rubber heel and sole segment of the industry scored gains over 1950 figures. For the first time, rubber bottoming materials accounted for more than 50% of the soling used in the shoe trade.

Firestone Statement

A new all-time sales record was established by the rubber industry in 1951, a record which may be surpassed during 1952 as new manufacturing equipment is put into production to meet the combined civilian and military requirements of the nation, Harvey S. Firestone, Jr., chairman of the Firestone company, said in his year-end statement.

During the year the rubber crisis came to an end as natural rubber production reached an all-time high and synthetic rubber output attained the highest rate in history.

Rubber industry operations through the year were conducted under strict national emergency restrictions in order to conserve available supplies of rubber. The recent relaxation of controls on the use of rubber in the manufacture of tires and other products now permits the rubber industry to produce a wider range of products to satisfy consumer requirements, it was said.

The year 1952 may lead to removal of some of the remaining government controls on use and manufacture of rubber provided the supply of plantation and synthetic rubber continues to increase and provided conditions in the Far East do not become more critical.

Business prospects for tire dealers in 1952 are very encouraging because of an 11% increase in the number of potential purchasers of replacement tires, it was pointed out. This increased requirement for replacement tires will more than offset an anticipated decrease in requirements for tires for new automobiles.

Mention was made of the many new and difficult new projects which call for development and production of equipment needed for military defense that Firestone was concerned with including guided missiles, rocket motors, tracks and other parts of tanks, stainless steel parts for jet engines, life boats and life vests, puncture-sealing gasoline and oil tanks, etc.

U. S. Rubber Forecast

H. E. Humphreys, Jr., president, U. S. Rubber, predicted that the rubber industry would operate near capacity in 1952 to meet the demand for civilian and defense products. Sales should run about 6% ahead of the record-breaking 1951 total of $5 billion, he said.

He does not expect a return of the scare buying which prevailed during part of 1951. Demand continues extremely high, but the public's buying habits have returned to a more orderly pattern.

Inventories of some products are still

low. They are being gradually rebuilt. The improvement in inventories will help us to give the public better service in the coming year, this rubber company official said.

The aggregate of natural and synthetic rubber available to the United States will exceed our ability to consume it. Certain kinds of synthetic rubber are already in surplus supply, and the government plans to sell it to foreign consumers. There is also a glut of natural latex.

Total rubber consumption for the United States is estimated at 1,336,000 tons for 1952, an increase of 8% over 1951 usage. Of this total, approximately 65% will be synthetic.

Mr. Humphreys said that, in his opinion, the rubber stockpile is now more than adequate for defense, and the time has come for a completely free market in natural rubber. Government officials have not yet returned buying to private industry, but have indicated that a free market is not far off.

Civilian tire sales for 1952 are expected to total 88 million units, compared with 83 million in 1951. Original equipment sales will be off owing to curtailed automobile production, but this will be more than offset by heavy replacement buying, it was said. The outlook is also good for sales of camelback and other materials used in recapping tires.

Belting, hose, and other industrial products will continue in strong demand in line with the general high level of industrial activity.

Waterproof footwear sales, which have increased during the last two years, are expected to continue at approximately the same rate. Tennis, basketball, and casual shoes made by the rubber industry are also expected to be in strong demand.

The production of foam rubber products for automobiles will decline in proportion to the drop in auto production, but foam mattresses and cushioning for furniture should enjoy a rising trend.

Chemicals and plastics, which are becoming increasingly important in the rubber industry, will continue to expand this year. Research will be intensified to develop new compounds and new uses for these materials.

It is expected that the industry will be able to fulfill all defense requirements. A large increase is expected in government orders for tires, rubber gasoline tanks, and other products used in aircraft. Large-scale production is expected to continue on rubber treads for tank tracks.

All indications point to a high level of employment in 1952, with the prospect of manpower shortages in a few locations and some overtime operation, Mr. Humphreys said in conclusion.

Litchfield Statement

P. W. Litchfield, Goodyear chairman, in his year-end statement said that in looking back across the old year, 1951, it is apparent that the most significant economic development was the build up of the forces of inflation.

Government, corporate, and personal debt have reached dangerous proportions. The dollar lost ground as a medium of exchange. Mounting federal taxes have discouraged corporate financing through new issues of equity stocks and have forced those looking for new money to borrow. Prices and wages have played leap frog with each other throughout the year and appear to be continuing the procedure as we enter 1952.

Looking forward into 1952 reveals mixed and dubious prospects. Some means must be found to arrest the inflationary trend; its momentum cannot be allowed to continue without inviting unpleasant economic consequences. Yet, with an election on our hands and the tensions of the world situation continuing unrelieved, corrective action on the inflation front may prove to call for more national courage than we are willing to exert. Thus the underlying situation is not too pleasant.

In the rubber industry business was exceptionally good during 1951, producing up to the limits of the available supply of raw materials. Rubber supply will increase in 1952 so that there will be sufficient to meet all demands.

With automotive production substantially reduced from 1951 levels, however, it is evident that the manufacture of tires for original equipment will fall off while the replacement tire market is being stimulated by the demand of car owners who are driving 1949 and 1950 models, Mr. Litchfield said.

With an ample supply of new raw rubber assured, and with substantial modification of government restrictions on its use, production of non-tire items is likely to be considerably higher in 1952 than it was in 1951. Military demands will be higher in 1952.

The overall prospect is that the American rubber industry will process about 1,300,000 tons of new rubber, an all-time high, as against a somewhat lower total in 1951.

In the absence of any sharp reversal of underlying inflationary pressures, 1952 will be a year of record employment and production in the rubber industry, Mr. Litchfield said in conclusion.

Collyer on Rubber Supplies

In a statement dated December 17, John L. Collyer, president of The B. F. Goodrich Co., said that world stocks of natural rubber, excluding those behind the Iron Curtain, will total approximately 1,800,000 long tons at the end of 1951, about 570,000 tons more than was available in the world at the time of Pearl Harbor.

"World production of man-made rubbers, about 95% of which is in the United States, is currently at a rate approaching one million tons a year and may exceed 1,100,000 tons annually. At the time of the Pearl Harbor attack, such capacity was only a few thousand tons a year," he added.

Collyer estimated that the total world output of natural and synthetic rubber this year should be about 2,900,000 tons, while world consumption is expected to be less than 2,500,000 long tons, thereby making available 400,000 long tons for addition to stocks in 1952.

"We now have, in the United States," he said, "all the man-made rubber that we can effectively consume in the manufacture of civilian and defense products and have built up stocks of sufficient size to permit government authorization for the export of some American-made rubbers to friendly nations."

"Crude natural rubber stocks in the United States at the year end will total about 850,000 long tons, and stocks of man-made rubber will total about 130,000 tons. Consumption of new rubber by the United States in 1951 will total 1,230,000 tons. Estimated consumption for 1952 is 1,300,000 tons, which, if attained, will be a new all-time high; 65% of the consumption will be American rubber and 35% crude natural rubber." Collyer also predicted.

Jackson on Business Outlook

President Jackson of Firestone, in a talk before the Oil Industry Tire, Battery & Accessory Group, in St. Louis, Mo., December 4, presented some interesting data on present and future rubber and rubber products production and consumption.

The title of Mr. Jackson's talk was "Selling Must Serve," and he first pointed out that the idea of business being a service as well as a means of making money is one of the best and most constructive changes that has taken place in the recent past. It has taught business men to realize that profits are not always made by aiming directly at profits, but by doing things well.

"It has also taught them that good will is a highly important factor and a treasured asset in their business. It cannot be bought and sold—it must be created—and the company or firm which serves its customers best also serves its community best, and is in sound position for success," he added.

With regard to the rubber industry's present and future position, Mr. Jackson said the industry will have a record year in 1951, with the largest dollar volume of sales ever experienced. Tire sales at 104,581,000 in 1950 was the record for unit sales; 1951 unit sales were estimated at 85,939,000; the figures reflect the higher costs and prices experienced in 1951.

Tire replacement sales in 1951 were estimated at 45,106,000 units, as compared with 67,885,000 replacement tires sold in 1946, the biggest year for this type of sales. It was estimated that industry replacement business can amount to 56,800,000 tires in 1952; 63,563,000, in 1953; and 65,504,000, in 1954. A figure of 67,449,000 for 1955 was also suggested.

"Assuming full use of all synthetic rubber facilities and a practical potential of natural rubber production, it is estimated that new rubber will be available to the United States in sufficient quantities to meet our full requirements through 1954, including government stockpile requirements," Mr. Jackson said. "A small deficit is shown for 1955, and without increased rubber production, this deficit increases to over 500,000 tons by 1960."

The increased supply of rubber for these deficit years must come through increased production of synthetic rubber, and this increased production can be achieved by building additional facilities or by learning how to get more production out of existing facilities, it was said.

In connection with the quality of synthetic rubber, the most encouraging progress during the past year was the development of GR-S techniques which gave remarkable results in truck, tractor, and other large-size tires. Millions of tire miles of testing on United States Army trucks and on tire-company test fleets now prove that heavy-duty tires containing from 30 to 60% synthetic rubber, depending upon their use, will deliver service comparable to tires made entirely of natural rubber. Our research scientists, however, are getting closer and closer to a type of synthetic rubber that will do a better job and run even cooler than natural rubber, Mr. Jackson stated.

Tire sales in 1955 were estimated at 109,914,000 units, including 4,276,000 tires for military use. Industry capacity is at present at 366,000 tires a day, which on the basis of 300 working days a year would amount to 109,800,000 tires. This total is about 19% greater than the combined civilian and military demand of 92,000,000 forecast for 1952. Some capacity additions

are planned, and by 1955 the industry's capacity will, therefore, be somewhat greater than it is today, since more tires can be produced when the military requirement is less of a factor, which we hope will be the case at that time, the speaker said. By 1955, annual demand also will have increased—to nearly 110,000,000 tires—and it is his judgment that capacity will not exceed demand in that year to any great extent, the speaker added.

Mr. Jackson pointed out that as the rubber situation at the present time improves, it does seem that our industry could be freed of some restrictions. He asked that natural rubber be removed from government control at the earliest practical date and suggested that a way should be found to sell or lease the synthetic rubber plants to private industry so that normal competition can act as an incentive to research and thereby produce better synthetic rubber at a lower cost.

Labor News

Some further details of the approval by the WSB on November 29 of the collective bargaining contracts between the CIO United Rubber Workers and the Big Four rubber companies providing wage increases of 13¢ an hour have been received. The agreements, which have set the pattern for the industry, were signed last summer and will cover more than 100,000 union members, according to union officials. (Total industrial employment in rubber products manufacturing, according to the U. S. Department of Labor, stood at 267,000 in October, off 6,000 from a month earlier and 2,000 from a year earlier.)

The WSB decision constituted "modified approval" of the union-management contracts, which took effect on July 30, 1951, for Firestone; August 3 for U. S. Rubber; August 6 for Goodrich; and August 27 for Goodyear.

The Board approved by a 10-to-2 vote, with the AFL members dissenting, a 6¢ hourly increase effective as of the various contract dates, plus an additional 6¢ effective as of October 16. Employers had joined the union in asking that the entire increase be approved retroactive to early August.

With industry members dissenting, the Board approved 8-to-4 a 1¢ hourly adjustment agreed to between the union and U. S. Rubber to increase the night-shift differential. A similar 1¢ increase was approved for the other companies in lieu of adjustment in the night-shift differential. This 1¢ increase was made effective as of the various effective dates of the contracts.

With labor members dissenting, the Board voted, 8-to-4, to disapprove a proposal of U. S. Rubber and the union to compensate for work performed on six specified holidays at triple-time instead of the double-time rate previously existing. The triple-time feature had been negotiated in the contract.

The WSB said that 6¢ of the total 13¢ hourly increase was allowable under General Wage Regulation 6 which provides for a 10% increase in wages over the rate paid in January, 1950. The additional 6¢ it justified under GWR 8 which provides cost-of-living increases to match the rise in the Bureau of Labor Statistics' Cost-of-Living Index since January, 1951. The index rose about 3.3% from January to mid-October

The contracts between the rubber companies and the URW did not specify pegging increases to the cost of living. The WSB, however, allowed such an increase anyway on the basis of its reasoning in an earlier decision involving the meat packing industry (and later written into GWR 8) that workers should not be penalized simply because their wage contracts fail to provide "escalator clauses" or other automatic cost-of-living adjustment procedures.

WSB approved pay raises for 1,600 production workers of Seiberling Rubber during the first week of December, and the Salary Stabilization Board approved similar raises for the company's office workers.

The hourly increase, like that approved for the Big Four company workers, is 13¢ an hour, but the retroactive portion is split, with the full 13¢ increase dating from October 16, and 7¢ of the 13¢ from August 13, date of the agreement between the URW union and Seiberling.

The increase for the company's salaried employes is for a similar amount. Checks covering the retroactive amounts were to be distributed to all hourly and office workers December 18, the company said.

At about the same time a 13¢-an-hour increase for more than 2,000 production workers at General Tire was approved by the WSB. Similar increases were approved for 1,500 office workers.

Seven of the 13¢ will be retroactive to August 13 and the remaining 6¢ from October 16. The company planned to get the retroactive pay ready for both production and office workers before Christmas.

EAST

Productivity Mission

Nearly 300 top European industrialists, representing the chemical, automotive, engineering, steel, food, building, electrical, machine tool, textile, and other industries, visited the United States late in November in an International Management Productivity Mission. The Mission was conducted by the National Management Council under the sponsorship of ECA, with the European participants coming from 18 Marshall Plan countries.

While ECA has brought to this country more than 5,000 European technical men during the past two years to study our production methods, this Mission was the first program designed to acquaint leading European industrial policy makers with American business methods and attitudes. The purpose of the Mission was to speed up the interchange of knowledge between European and American businessmen in order to stimulate greater productivity.

The European delegates were divided into 22 teams, in accordance with their fields of interest, and taken on tours that included plant visits, discussions with American management, and trips to workers' homes, schools, hospitals, and other institutions. After two weeks in the field the delegates attended a conference in Washington on November 30 where they heard top American government officials discuss our foreign policy aims in the spheres of economics, politics, and military defense.

Following the tour and conference came the First International Conference of Manufacturers, held in New York, N. Y., under the sponsorship of the National Association of Manufacturers on December 3-5. This meeting was devoted to discussions of policies with regard to production, marketing, employe relations, finance, competition, and public relations.

Cities visited by the Mission, in addition to New York and Washington, included Akron, Cleveland, Cincinnati, Middletown, and Toledo, O.; Detroit, Mich.; Chicago, Ill., Milwaukee, Wis.; Minneapolis, Minn.; Pittsburgh, Lebanon, and Philadelphia, Pa.; Ashville and Durham, N. C.; Boston, Mass.; and Rochester, Syracuse, Buffalo, and Elmira, N. Y. In each of the cities visited, leading American industrialists cooperated by forming committees to handle all arrangements. The official committee of sponsors consisted of 83 leading businessmen, including Harvey S. Firestone, Jr., chairman of Firestone Tire & Rubber Co., John L. Collyer, president of the B. F. Goodrich Co., and E. J. Thomas, president of Goodyear Tire & Rubber Co.

Team D2 on rubber and plastics chemicals was led by Theodore Knauth, National Management Council, and included Niels Aars-Nicolaysen, general manager of A/S Askim Gummivarefabrik, Norway; Albert Schafer, board chairman of Harburger Gummiwaren-Fabrik Phoenix A. G., Germany; and E. L. C. Schiff, president of N. V. Rubberfabr. "Vredestein," The Netherlands.

The itinerary for the D2 group began on November 19 with an introductory conference in New York. On November 20 the team visited United States Rubber Co. and conferred with the company president, H. E. Humphreys, Executive Vice President H. Gordon Smith, Vice Presidents H. S. Marlor, J. W. McGovern, Elmer Roberts, Arthur Surkamp, G. M. Tisdale, and E. H. White, and Secretary W. M. Dougherty. On November 21 there was a tour of the International Business Machines Corp. plant at Poughkeepsie, N. Y.

After a special Thanksgiving Day program at Remington Rand, Inc., Norwalk, Conn., the team went to Akron on November 23 and 24 and visited the Goodrich, Goodyear, and Firestone plants. November 26 and 27 were spent in Detroit, where all the teams participated in a special program involving many plant tours. Dayton was visited on November 28 and 29, and the team ended its program with the Washington conference on November 30.

Farrel Buys Tool Firm

Farrel-Birmingham Co., Inc., Ansonia, Conn., has acquired the common stock of Consolidated Machine Tool Corp., Rochester, N. Y., part of the consideration being securities of Farrel-Birmingham. The Consolidated plant will be operated as a subsidiary of the F-B company and will continue production of its well-established machine tool lines. Arthur H. Ingle will remain as president of Consolidated and will become a director of Farrel-Birmingham.

Uniting the interests of these two firms brings together nearly two centuries of machine and machine tool design and manufacture. The Rochester plant augments Farrel-Birmingham's existing facilities at Ansonia and Derby, Conn., and Buffalo, N. Y., and will better enable the company to meet the constantly growing requirements of customers in the many and varied industries it serves.

Consolidated machine tools, which include lathes, planers, boring mills, milling machines, drilling machines, cold saws, slotters, bending rolls, plate planers, railroad tools, and others, will make compatible additions to Farrel-Birmingham's present list of heavy machinery products and broaden the markets for the company's overall production.

Chemical Industries Show Sets New Records

New records for attendance and number of exhibits in the 36-year history of the show were set by the Twenty-Third Exposition of Chemical Industries, held in Grand Central Palace, New York, N. Y., on November 26 to December 1. All four floors of space at the Palace were occupied by 457 exhibits covering the entire field of industrial chemistry. Despite exclusion of the general public, approximately 47,000 visitors registered at the show and contributed to the general impression of interest and activity.

Actual business transacted at the Exposition was only moderate, owing to metal shortages which are hampering the manufacture of equipment. Most exhibitors, however, noted a marked increase in the number of engineering problems brought in for discussion by the visitors. This increase in technical interest was also reflected by the fact that exhibiting companies expanded their staffs to include more engineering and technical service personnel for consultative work.

As in previous shows, machinery and equipment manufacturers and suppliers comprised the major portion of displays. In view of the general chemical nature of the show, most of these exhibits were devoted to general processing equipment such as agitators, materials handling equipment, corrosion resistant equipment and materials, laboratory equipment, heaters and dryers, dust and fume collectors, instruments, piping and fittings, pumps, valves, grinders and separators, and power generation and transmission equipment.

Some of the exhibits of interest in the equipment category were those of American Hard Rubber Co. and Luzerne Rubber Co., on hard rubber pipe, fittings, and other handling equipment; Cambridge Instrument Co., Inc., and Foxboro Co., on controlling, indicating, and recording instruments; Cleaver-Brooks Co., on package-type steam boilers; Baker-Perkins, Inc., on kneaders and centrifugals; J. H. Day Co., on pony mixers, kneaders, and other mixing equipment; Eagle-Picher Sales Co. and Johns-Manville Sales Corp., on mineral-type thermal insulations; Garlock Packing Co., on packings, gaskets, and rubber tubing, sheets, seals, and expansion joints; General Electric Co., on electrical measuring and processing equipment; Radio Corp. of America, on industrial television, dielectric heaters, and improved metal detectors; Foster D. Snell, Inc., on consulting services to the chemical industry; U. S. Stoneware Co., on Tygon tubing and coatings, and mixing and grinding equipment; and Westinghouse Electric Co., on electrical motors and controls for chemical processing equipment.

Among the chemical products exhibits were those of American Polymer Corp., and American Resinous Chemicals Corp., rubber and plastics adhesives, latices, and special formulations; Ansul Chemical Co., Ansul-Blo, rubber blowing agent, and other specialties; Atlas Powder Co., Pycal plasticizers, Atlac polyester resins, and surface-active materials; Bareco Oil Co., rubber-containing waxes; Boler Petroleum Co., Paraffiex waxes containing polyethylene; Commercial Solvents Corp., petrochemicals; Emery Industries, Inc., fatty acids and esters; General Electric Co., silicone rubbers and resins, and other plastic resins and coatings; National Lead Co., coating materials and Dutch Boy vinyl stabilizers; Reichhold Chemicals, Inc., products for the textile, ink, paper, and plywood industries; Socony-Vacuum Oil Co., plasticizers, oils, and waxes; Tennessee Eastman Co., Tenite plastic; and Victor Chemical Co., detergents and chemical intermediates.

American Monomer Corp. displayed its new Acrylon BA-12 and EA-5 acrylic rubbers. Nine new chemicals, including two new Flexol vinyl plasticizers, 2GB and CC-55, were shown for the first time by Carbide & Carbon Chemicals Co. Hercules Powder Co. exhibited new non-ionic surface-active agents and synthetic resins for coating purposes. Monsanto Chemical Co. featured 29 new chemicals and intermediates made available during the past year, including Sulfasan R, a rubber vulcanizing agent, and 1-3 bis (o-ethyl phenyl) guanidine, available in pilot-plant quantities as a new rubber accelerator.

Raymond E. Olson

Olson Heads Taylor Cos.

At a meeting of the board of directors of Taylor Instrument Cos., Rochester, N. Y., held immediately following the annual stockholders' meeting on November 21, Raymond E. Olson was elected president to succeed Lewis B. Swift, now chairman of the board.

Olson joined the firm in 1917. In 1927 he became manager of the application engineering department; in 1944, a director; in 1945, general sales manager; and in 1946 vice president. He is also a vice president of Taylor Instrument Cos. of Canada, Ltd. He is credited with 23 patents, 13 of them in the dairy instrument field. In 1949 and 1950 he was president of the Dairy Industries Supply Association and at present is chairman of the executive committee of the board of directors.

All other Taylor officers were reelected as follows: Herbert J. Noble, executive vice president and treasurer; Fred K. Taylor and P. Richard Jameson, vice presidents; Rodney C. Mertz, secretary. The above officers were reelected as directors and in addition the following: David C. Barry, M. Herbert Eisenhart, Karl H. Hubbard, Harry Y. Norwood, Arthur F. Reed, Thomas M. Stewart.

Sales Department Changes

Mr. Olson later announced several major changes in the supervision of the sales department.

Replacing him as general sales manager is Frank S. Ward, since 1945 industrial sales manager. Ward started in the order department of the company in 1917. In 1922 he moved to Boston as a salesman for the industrial line of instruments and in 1931 was made manager of the Boston office. Returning to Rochester, he supervised sales of products in the canning, textile, and rubber industries from 1936 to 1945.

Ward's place as industrial sales manager goes to Albert J. Fleig, since 1945 divisional sales manager in charge of sales to the chemical, petroleum, and canning industries. He joined the organization in New York in 1919, handled a sales territory in Philadelphia until 1927, when he was called to Rochester, and 1930 took charge of all sales to the petroleum industry, later adding the chemical industry.

George E. Heller has been made manager of a new industrial sales division handling products sold to the chemical industry. Heller joined Taylor in 1935 and was sent to the Atlanta office to do application engineering in the textile industry. Returning to Rochester, he entered the application engineering department, working with the dairy and chemical fields. Last March he became associated with the industrial sales department.

Richard N. Pond becomes a divisional sales manager handling the rapidly growing sales of industrial instrumentation to the petroleum industry as well as the canning industry. Pond started in 1941 as a member of the application engineering department. He entered sales work first in 1945 as a field representative in St. Louis and in 1949 as a member of the Rochester office staff.

Broadens Products Field

Spencer Rubber Products Co., Manchester, Conn., manufacturer of phenolic rubber sponge and rubber bands for office, industrial, and agricultural use, has entered the industrial molded rubber goods field, according to President W. Robert Spencer.

Ward W. Killion has been named to head the new division as manager of molded goods operations. Mr. Killion joins Spencer after serving three years as assistant sales manager of Tyer Rubber Co., Andover, Mass. Previously he had been with Goodyear Tire & Rubber Co. in various capacities for 15 years in the mechanical goods division, the last six years as special sales engineer at the St. Marys molded goods plant.

Spencer Rubber has added modern tool making and molding equipment to produce a wide range of precision molded rubber products in practically any size, shape, or form. The company has also complete and up-to-date rubber research laboratories. The firm is currently supplying many precision parts to the aircraft industry.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., has announced that a new plant for the manufacture of Selectron polyester resins is under construction at Springdale, Pa. According to E. D. Griffin, vice president in charge of the paint division, the resin plant will adjoin the paint manufacturing facilities. The company began production of Selectron resins in 1943 at Milwaukee, Wis., and the materials have found widespread use in both defense and civilian applications. Completion of the new plant, expected within four to five months, will double the firm's current Selectron production capacity.

Goodrich Appointments

Several appointments in the tire manufacturing division of The B. F. Goodrich Co., Akron, O., were announced last month.

Fred N. Lehmann, with Goodrich 11 years, has been named staff superintendent; and George S. Ketter, with the company five years, becomes manager of industrial engineering for the division. Lehmann for the past three years was production superintendent at the company's Oaks, Pa., plant, where Warwick McCutcheon succeeds him. McCutcheon was manager of industrial engineering in the division for the last two years; he joined Goodrich six years ago.

Gordon W. Anderson has been appointed production superintendent at the Tuscaloosa, Ala., plant. He was manager of industrial engineering at the Miami, Okla., plant for seven years and has been with Goodrich 27 years. Succeeding him at Miami is George J. Kroupa, Jr., who started with the company five years ago.

New Rubber Exhibit

A 60-foot high guillotine on which visitors can try to "execute" a puncture-sealing tubeless tire will be one of the features of a new rubber exhibit to be opened next spring by Goodrich at the Museum of Science & Industry, Chicago, Ill. A 58-foot long moving sidewalk of rubber will provide transportation for visitors through a tire-shaped gateway to various exhibits showing rubber at work in the transportation field. A major exhibit will trace the processing of synthetic rubber from the raw materials stage to the finished product and will feature the actual mixing and preparation of rubber stocks in miniature factories. Visitors will push a button and see a car lifted off the ground by a two-inch thick piece of rubber cemented to a steel hoist by a special process. With the aid of a strobelight, they will also see the flexing action of a tire rolling at 70 miles an hour under a normal load. Other exhibits will illustrate the collection of crude rubber on plantations; the preparation of the various ingredients of cold rubber; the manufacture and braiding of hose; uses and applications of Geon vinyl plastics; the operation of various belt systems; the manufacture of rubber footwear; the elasticity and toughness of surgeon's gloves; and the operation of rubber deicing boots for airplane wings. According to J. W. Keener, Goodrich vice president, the display will occupy 8,280 square feet of floor space, including a model theater showing a movie on tire manufacture.

Other Company Activities

A voluntary, free check on employes' vision is being conducted by Goodrich in its Akron plants through its medical and employe service departments. A machine called the Sight Screener is used, and results of the tests are studied by the medical department, and a sealed report is sent the employe. When the check result is unsatisfactory, the report suggests that the recipient take an eye examination. Believed to be the first staged by any large company in the Akron area, the vision check program is expected to take about 18 months to cover all manufacturing and engineering divisions in Akron.

An "incubator" treatment is being used by Goodrich in its Akron factory devoted to manufacturing fan belts and industrial V-belts. The entire factory is humidity controlled, and the area is sealed off from other operations to maintain a constant amount of moisture in the air. Rayon and other fibers and fabrics used in the belts have a tendency to absorb moisture from the air. When the moisture content of the air varies from day to day, the belt fibers absorb varying amounts of moisture during manufacture, and the finished belts then shrink or stretch unequally and cannot be used in matched sets. Control of humidity at the factory eliminates this problem.

The formal opening of Goodrich's new district offices, warehouse, and sales rooms at Erie Ave. and I St., Philadelphia, Pa., took place January 8 with an open house attended by John L. Collyer, company president and board chairman. Mr. Collyer was guest of honor at a luncheon attended by leading industrialists and bankers in the Philadelphia area. A modern steel frame and masonry structure, the new building has been in use for several months, centralizing Goodrich and Hood Rubber Co. Division district offices. The building contains a modern show room, sales offices, service station, and warehouse area of 67,000 square feet.

Bob Olen

A. M. Kahn *(Center)*, M. I. Cowen *(Left)*, and H. Kahn at Consolidated Products' Thirty-Fifth Birthday Fete

Kahn Board Chairman

At a testimonial dinner tendered A. M. Kahn at the Waldorf Astoria on the occasion of the thirty-fifth anniversary of the founding of the company, he was elevated to chairman of the board of Consolidated Products Co., Inc., 15 Park Row, New York, N. Y. Herman Kahn was elected president, and M. I. Cowen, treasurer.

In his speech of acceptance A. M. Kahn indicated that the growth of Consolidated Products, one of the largest companies handling used equipment for the chemical and process industries, coincided with the tremendous strides and expansion of the American chemical industries since World War I.

A. M. Kahn recently was elected president of Spear & Co., furniture house. He is also president of Acme Hamilton Rubber Co., Trenton, N. J.

Association of Consulting Chemists & Chemical Engineers, Inc., 50 E. 41st St., New York 17, N. Y., has made the following appointments for 1952: Robert T. Baldwin, executive secretary and assistant treasurer; and A. B. Bowers, director of publicity and assistant executive secretary.

Cabot Staff Changes

Godfrey L. Cabot, Inc., carbon black manufacturing concern with headquarters in Boston, Mass., has made the following appointments to its Boston research and development department and to its Pampa, Tex., development division.

B. B. S. T. Boonstra, formerly chief of the technical laboratory of Rubber-Stichting, Delft, Holland, has joined the Boston staff as head of the rubber research group. E. M. Dannenberg continues in charge of the applications research and technical service section, which includes responsibility for research on rubber and plastics.

James C. MacKenzie has been chosen to lead the organic research group, devoted particularly to the development of plasticizers. Mr. MacKenzie, comes to Cabot from the central research laboratories of Canadian Industries, Ltd., McMasterville, P.Q.

R. E. Dobbin, head of the applied research section in Boston, has been appointed assistant director of Cabot's development division, Pampa, to replace N. D. Steele, now assistant to the production manager. Dobbin is succeeded in Boston by R. N. Secord, a research engineer with the company for the past five years.

Other new appointees to the Boston research and development department include R. D. Beattie, formerly with Dewey & Almy Chemical Co.; T. E. Billington, formerly with Koppers Co.; and K. A. Loftman. Mr. Billington and Mr. Loftman both worked at the Cabot laboratories while studying at Northeastern University under the cooperative plan.

News from Timken

Timken Roller Bearing Co., Canton 6, O., has announced that 25% of the employes at its Canton and Gambrinus, O., plants went on a five-day working week on November 17; while the balance of its employes at these and the Zanesville and Columbus plants remain on a six-day week. In a letter to the employes, President W. E. Umstattd explained that cutbacks ordered in the automotive and farm machinery fields have resulted in many contract cancellations for the small bearings used in this equipment. While faced with the prospect of cutting back on its production schedules, Timken is endeavoring to avoid laying off employes by shifting workers to machines used in manufacturing larger-size bearings.

Timken has also appointed R. G. Wingerter assistant general manager and J. R. Splitstone district manager of its automotive sales division. Both men will continue their headquarters at the company's general automotive sales division offices at 3107 W. Grand Blvd., Detroit 2, Mich.

Mr. Wingerter has served as a sales engineer in the Detroit office for the past seven years. Previously he had been in the application engineering department at the company's main offices in Canton.

Mr. Splitstone, after several years at the engineering offices at Canton, was transferred to the automotive division in Detroit in 1940, where he has since served as sales engineer.

George O. Wherley, general credit manager of Timken Roller Bearing, has been named president of the Motor & Equipment Manufacturers Association. He has been active in the Association for many years, having served on the executive board of the credit department for eight years and as a director for two.

Goodrich Chemical Notes

The Louisville, Ky., plant of B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O., recently was presented the Award of Honor for Distinguished Service to Safety by Capt. Estel Hack, managing director of the Louisville Safety Council. Captain Hack congratulated a representative group of the 850 plant employes for having completed more than 1,500,000 hours of continuous operation since September 5, 1950, without a lost-time injury. He pointed out that this was the third such award made in the greater Louisville area during the 31 years of the Safety Council's existence. The plant, consisting of 57 buildings covering approximately 60 acres, produces plastics, Geon resins and latices, and Hycar rubber.

Goodrich Chemical has appointed Polymer Southern, Inc., Greenville, S. C., distributer for the southeastern states of Good-rite TS-20, a processing size for nylon. Polymer Southern will provide complete servicing and warehousing facilities for the product. Designed to satisfy the need of an improved material for single end sizing and warp slashing of nylon, TS-20 is supplied as a 25% total solids solution which may be diluted with cold water.

William I. Burt, vice president of Goodrich Chemical, was elected president of the American Institute of Chemical Engineers at its forty-fourth annual meeting on December 3 at Atlantic City, N. J. Burt, who served two terms as a director of the A.I.Ch.E. and was vice president last year, joined Goodrich in 1927 and was superintendent of production of the chemical division and manager of the chemical manufacturing division before becoming vice president in charge of manufacturing.

Product Developments

A new chemical shortshop has been developed by Goodrich Chemical for use in the manufacture of GR-S. Called Good-rite "Shortstop" 3955, the new chemical is effective in both cold and hot processes for making GR-S and overcomes many of the difficulties encountered with previously used materials, such as high cost, toxicity, discoloration, and inefficiency, it is claimed. The polymerization reaction between butadiene and styrene in making GR-S is stopped at 60-75% completion by the new shortstop. Allowing the reaction to proceed to a higher conversion point would yield a rubber so tough that it would be almost impossible to process.

Geon vinyl plastic latex, a product of Goodrich Chemical, is used in the manufacture of Spiratube, a new flexible fabric tubing for ventilation and product handling, made by Flexible Tubing Corp., Guilford, Conn. In construction, the tubing consists of a preformed continuous spring wire ribbing overlapped with spirally wound woven fabrics of alternating types. After fabrication the tubing is coated with the Geon latex to provide abrasion and chemical resistance. While originally designed for ventilating purposes, Spiratube is easily adapted to the conducting of air and other gases, many solids, and liquids at low pressures.

A new O-ring seal compound has been developed by Precision Rubber Products Corp., Dayton, O., for use in farm tractor hydraulic systems. Based on Goodrich Chemical's Hycar nitrile rubber, the compound has exceptionally good high and low temperature properties and may be used with almost any petroleum-base hydraulic fluid.

Phenolic resin modified with Hycar rubber, a product of Goodrich Chemical, has solved many problems for Compo Shoe Machinery Corp., Boston, Mass. One application is a toe rubber, an iron arm capped with the rubber-phenolic, which holds a shoe in place while a platform is attached to the sole. Another use of the material is in a washer essential in the mechanism of several Compo machines. A Hycar phenolic roller is used to feed shoe soles into a machine for roughing prior to cementing. Other applications include a horn rubber for removing soles from a last; wedges for shaping the soles of finished shoes; and piston washers for air motors. In each application, the rubber-phenolic material has given results surpassing the materials previously used.

Firestone Activities

Stainless steel parts for the J-47 jet engine used in fighter and bomber planes will soon be manufactured by Firestone Tire & Rubber Co., Akron, O., under a multi-million dollar contract recently received. Firestone will deliver the parts to General Electric Co. and Packard Motor Car Co., builders of the engine used in F-86, F-91, and B-51 planes. The parts to be made by Firestone comprise the combustion chambers, transition liners, turbine castings, and exhaust cones.

G. C. Applequist has been made manufacturers' sales representative for the Firestone company in the Detroit, Mich., area. Mr. Applequist joined Firestone on November 30, 1936, and served as store manager, store supervisor, manager of truck tire sales in the Midwest division, assistant division manager of the division, and Firestone district manager.

Firestone Industrial Products Co. has announced a change in the manufacturing and selling plan for Foamex slab stock as the result of several months of product development, marketing study, and improved manufacturing technique. Recognizing that Foamex slab usage falls largely into two classifications, upholstery cushioning and specialty use, Firestone is now offering two types of Foamex sheet stock: (1) upholstery-type slab, an improved Foamex stock for all types of upholstery and bedding cushioning; and (2) "High Test" type of slab for uses such as shoe insoles, accessories, cosmetics, and other specialties. The "High Test"-type slab is quoted at the same prices as the former all-purpose slab, but the upholstery-type slab has been reduced approximately 14% in price as the result of production economies.

The Bearfoot Sole Co., Inc., First and Water Sts., Wadsworth, O., at a recent board meeting reported that its $250,000 expansion program is nearing completion, with the new laboratory expected to be in operation by February 1. The new line of Nitrocrepe soles and heels and of Aircushion micro-cellular soles, slabs, and inner soles has substantially increased production. Further expansion is contemplated if building materials are made available and if synthetic rubber is decontrolled. The company pioneered in the manufacture of Type S Neoprene soles and has been a major supplier of soles and heels to shoe manufacturers only for the past 28 years.

Increasing Flexol Output

Carbide & Carbon Chemicals Co., Division of Union Carbide & Carbon Corp., New York 17, N. Y., has announced that the production of its Flexol Plasticizer TOF, tri(2-ethylhexyl) phosphate, will be doubled with the construction of new facilities at its South Charleston, W. Va., plant. Construction will get under way as soon as the necessary materials can be obtained, and production is expected to begin before the latter part of 1952. Production from the new unit will be used entirely for defense purposes; the plasticizer is used in many essential plastic and synthetic rubber products because of its good low-temperature flexibility and resistance to water, weather, and mildew. This combination of properties has created a demand for the plasticizer in such uses as jacketing for special communication cable, coated cloth for arctic tenting and vehicular upholstery, rubber gaskets used in naval applications, and aircraft hose and other rubber products operating at very low temperatures.

Tour of Tour's Laboratory

Sam Tour & Co., 44 Trinity Place, New York, N. Y., a member of the Association of Consulting Chemists & Chemical Engineers, Inc., was host to members of the Association and invited guests at a cocktail party and conducted tour through the company's eight-floor laboratory building, from 4:00 to 7:00 p.m., December 12.

Extensive facilities for testing, investigations, research development, and consulting in the fields of chemical, metallurgical, and mechanical engineering were viewed. Specialized equipment for nondestructive (electronic) testing, corrosion, wear, and low-temperature testing, plastic and paper testing, as well as for electropolishing, radiography, electro-deposition of metals, metal finishing, heat treating, special alloy melting, precision casting, powder metallurgy, catalytic cracking, and vacuum and vapor treatments were shown.

New York Quartermaster Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently announced awarding the following contracts for: *synthetic rubber-coated raincoats* to Archer Rubber Co., Milford, Mass., and Cable Raincoat Co., Boston, Mass., both orders in excess of $250,000; *rubber insulated combat boots,* Bristol Mfg. Co., Bristol, R. I., Hood Rubber Co., Watertown, Mass., Goodyear Rubber Co., Middletown, Conn., and United States Rubber Co., Naugatuck, Conn.—all orders in excess of $250,000—and Cambridge Rubber Co., Taneytown, Md., 6,000 pair, $126,000.

Kentucky Synthetic Rubber Corp., Louisville, Ky., has established a research and development department at the government-owned plant there. The pilot-plant has been reactivated and equipped for polymerization at low temperatures. A program directed toward the development of new synthetic rupbers for non-tire uses, sponsored by the Reconstruction Finance Corp., will be undertaken. N. R. Legge, formerly leader of the physical research laboratory of Polymer Corp., Ltd., Sarnia, Ont., Canada has been appointed director of the research and development department of Kentucky Synthetic Rubber Corp.

Goodyear Appointments

Mark W. Laibe, a division manager of the purchasing department of Goodyear Tire & Rubber Co., Akron, O., succeeds E. H. Brooks, director of purchases for the firm, who retired January 1.

Rollin D. Chittenden, manager of another division within the purchasing organization, has been appointed purchasing agent, a position unfilled since the death of George Price in 1947.

Laibe joined Goodyear in 1925 in purchasing, changed to Goodyear Aircraft Corp. at the start of World War II as assistant purchasing agent, and continued there until end of the war, when he returned to his former duties with Goodyear Tire. He was promoted to assistant purchasing agent there in March, 1947, then was elevated to his most recent position in June of that year.

Brooks started with Goodyear in 1909 as a cost clerk, in 1910 became acting head of the cost and payroll department, two years later was named factory statistician, in 1913 became manager of the materials department, four years later was promoted to the post of purchasing agent, and was made director of purchases in 1937.

Chittenden started with Goodyear in 1920 in the efficiency department, later transferred to production control, and in 1922 switched to his present department. He began in purchasing as a buyer, was advanced to assistant purchasing agent in 1930 and to most recent post in 1947.

Robert H. Kilgore, assistant manager of the films and flooring division at Goodyear, has been made manager of field sales. This new position was created because of the rapidly expanding sales activities of the division, which embraces the Pliofilm, Vinylfilm, and flooring departments, and it will place Kilgore in closer contact with representatives for the three departments throughout the country. Additional sales representatives are being assigned to handle specific products, thus rendering customers more specialized services on products.

Mr. Kilgore has been a member of the Pliofilm department for several years following his return from military service in 1945. He was named manager of the Cleveland district for his division's products in 1948 and became the assistant manager of the division last year.

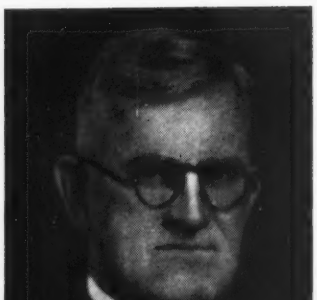
William E. Kavenagh, for the past 15 years development manager of the Windsor Mfg. Co., Goodyear subsidiary at Windsor, Vt., has been named director of shoe products research and development for the Goodyear organization.

Kavenagh will be succeeded at Windsor by Walter S. Edsell, Jr., his assistant in recent years.

Mr. Kavenagh will continue to headquarter at Windsor, Goodyear's major producer of rubber heels and soles and Neolite.

Mr. Kavenagh three years ago was presented the Litchfield Award of Merit for his part in the development of Neolite. He has been with the company continuously since 1925, but first joined the organization in 1900 as its first rubber compounder. In 1910 he assisted in placing the Bowmanville, Ont., plant in operation and in 1914 was placed in charge of mechanical goods development at Akron. He has been in charge of development work on soles and heels since 1930 and has been at Windsor since 1936. Mr. Kavenagh, incidentally, is the sole and heel expert on the editorial advisory board of India RUBBER WORLD.

Mr. Edsell has been with Goodyear since 1928. He went to Windsor as chief chemist in 1936.



Berkeley Studio

William E. Kavenagh

New Tires Announced

A new motorcycle tire has been developed by Goodyear for use in both on- and off-the-road travel and in any type of weather. Designated the Grasshopper, the new tire is said to have an extremely rugged tread whose surface is composed of self-cleaning blocks that give positive traction in mud, snow, grass, clay, or paved roads. Already in wide use in England, the new tire has proved especially popular there in such events as hill climbs, field meets, and speed tests. The tire is made in 5.00-16 and 3.25-19 sizes, both of which are available for immediate export, and replaces Goodyear's DeLuxe All Weather motorcycle tire in the 5.00-16 size.

Superior traction in both loose or hard-packed snow and on icy, slippery highways is claimed to be the outstanding feature of a new snow and ice tire announced by Goodyear. Termed the Suburbanite, the tire is particularly advantageous for access from homes to main highways. The tire is also said to provide a softer, smoother, and quieter ride than previously obtained with mud and snow tires.

Ward, Others Advanced

Gregg T. Ward has been appointed general sales manager of the footwear and general products division, United States Rubber Co., Rockefeller Center, New York 20, N. Y., and will be responsible for all sales activities of the division, which makes footwear, aircraft fuel cells, foam and sponge rubber products, waterproof clothing, coated fabrics, golf balls, waterwear, plastics and a variety of other products.

Mr. Ward joined the company in January, 1925, as a sales clerk in the San Francisco branch and later became manager of footwear sales. In 1930 he was transferred to the Baltimore branch as sales manager and the following year was named sales manager of New York branch. His next important promotion came in 1939 when he was assigned to the headquarters staff in New York as manager of sales-development for footwear, clothing, and foam rubber. A year later he was made sales manager of the nation-wide branch sales organization, where he was responsible for all products of the footwear division sold primarily through retail outlets. In November, 1949, he was appointed general merchandise sales manager of the footwear and general products division.

Mr. Ward, on December 13 announced the following promotions:

C. Wm. Pennington, to general merchandise sales manager, responsible for the sale of all products of the division sold primarily through retail outlets.

Charles F. Kadlec, to sales manager of wholesale products, in charge of sales through wholesale outlets.

Augustus C. Ware, who succeeds Mr. Kadlec as branch footwear sales manager, with headquarters at Naugatuck, Conn., will be responsible for all sales of Keds, Kedettes, and waterproof footwear.

Mr. Pennington started with the company in February, 1926, as a stock clerk at Portland, Oreg. After several promotions, he became district sales manager of the Seattle branch in 1937, and the next year, district sales manager of the San Francisco branch. In July, 1940, he was appointed division sales manager of the Pacific Coast, with headquarters in San Francisco. Early in 1947, Mr. Pennington was made sales manager of waterproof clothing and coated fabrics at the Mishawaka, Ind., plant. Two years later he was appointed sales manager of wholesale footwear, with headquarters at Naugatuck. Then in July, 1950, he became sales manager of wholesale products, with headquarters in New York.

Mr. Kadlec has had more than 24 years' footwear sales experience with the rubber company, practically all in sales management. In October, 1949, he was appointed branch footwear sales manager.

Mr. Ware started with U. S. Rubber in 1919 as an order clerk at Atlanta. After years of successful selling, he was appointed district sales manager of the Atlanta branch, in 1937. From July, 1941, to May, 1945, he served at the company's headquarters in New York as manager of sales development in the footwear division, returning to Atlanta branch as district sales manager in 1945.

Carlton H. Gilbert has been named to the newly created position of advertising manager of the company, effective February 15. Mr. Gilbert has had 24 years' experience in advertising. In 1934 he joined the sales promotion department of the rubber company's footwear division and in 1939 was appointed sales promotion manager of the division; later he became also advertising manager of the division.

Alvin F. Buchanan has been appointed advertising manager of the footwear and general products division. He joined the rubber company in March, 1926, as an assistant in advertising for the mechanical goods division. After various promotions he was appointed in 1939 assistant to the company's director of advertising, T. H. Young. In this position Mr. Buchanan supervised advertising of the company's textile and chemical division.

Harry C. Oliver, western divisional manager, U. S. Tires, has been advanced to assistant sales manager, U. S. Tires, and will assist Sales Manager Lawler Reeves and D. B. Eldred, also an assistant sales manager, in the overall supervision of U. S. Tires rapidly expanding activities. Oliver started with the company in 1939 and served as district manager at Atlanta, Memphis, and Los Angeles before his appointment last September as western divisional manager.

Roy W. Collings, manager of market development, moves from the New York offices to succeed Oliver as western divisional manager. His division will include the sales districts of Los Angeles, San Francisco, Denver, and Salt Lake City. He will maintain headquarters at U. S. Rubber's Los Angeles plant. Collings joined the rubber company in 1931. Since that time he

has filled many important assignments including those of district and divisional sales manager. He was New York divisional manager from 1943 to 1946. Besides serving as manager, market development, in the New York office, Collings also served as manager of the franchise department.

George H. Pendleton, who retired December 31, was guest of honor December 28 at a luncheon in the New York Athletic Club, given by his associates of the company's mechanical goods division. Since 1936 he has been manager of government sales for that division. Mr. Pendleton began his employment with U. S. Rubber, July 7, 1905. His first job was in the New York office of Peerless Rubber Mfg. Co., which later became part of U. S. Rubber. From 1907 to 1918 he was employed at the Peerless plant in North Bergen; then in 1918 he joined the export division of U. S. Rubber. In 1932 he transferred to the mechanical goods division.

Other U. S. Rubber Activities

U. S. Rubber has nearly completed arrangements for the private placement of a long-term loan for $50,000,000. The loan, with interest at 3¾%, will be due January 1, 1982, and will have an average life of a little more than 24 years, unless earlier payment provisions are exercised. The money may be borrowed during 1952 in installments as required, with a stand-by fee until borrowed. It is anticipated that the money will be needed for the rebuilding of normal inventories, other working capital relating to defense business, and for miscellaneous capital additions.

U. S. Rubber recently installed a huge rubber and fabric expansion joint between the steam turbine and condenser in the Green's Bayou Station of the Houston Lighting & Power Co., Houston, Tex. The joint is eight feet high, 21 feet wide, and one foot deep between faces and compensates for different rates of expansion and contraction between turbine and condenser. Made in the rubber compay's Passaic, N. J., plant, the expansion joint also isolates vibration and provides the durable seal essential in a vacuum system.

A new plastic wheel that promises to take the noise and slip out of roller skating has been developed jointly by U. S. Rubber and Fo-Mac Enterprises, Inc., Tulsa, Okla. Made of U. S. Rubber's Enrup, a thermosetting plastic, the new wheels are said to produce only a quiet hum when in use, and to wear 50% longer than wood wheels and 25% longer than fiber wheels. In addition, the Enrup wheel gives a tighter grip on the rink floor, thereby reducing the danger of slipping. The plastic wheel also wears down without developing flat spots as do wood and fiber types. For rink operators, the new wheels mean reduced maintenance and replacement costs for skate wheels and eliminate the need of dusting the floors to reduce slipping.

Hewitt-Robins, Inc., 370 Lexington Ave., New York 17, N. Y., has moved its Philadelphia, Pa., office and warehouse from 401 N. Broad St. to Coral and Hagert Sts. The new quarters, which serve as office and warehouse for the Hewitt Rubber and the Robins Conveyors divisions of the company, will improve delivery and stock facilities.

Henry P. Bristol, chairman of the board of Bristol Myers Co., is again chairman of the Chemicals, Drugs & Rubber Division for the The Salvation Army's 1952 Appeal.

OBITUARY

John W. Thomas

John W. Thomas

JOHN WEBSTER THOMAS, honorary chairman of The Firestone Tire & Rubber Co., Akron, O., and its former president and chairman of the board, died of a heart ailment, November 26, in an Akron hospital.

Mr. Thomas, closely connected with the world-wide advancement of the rubber industry for more than four decades started as Firestone's only chemist in 1908 and eventually organized the company's laboratories. It was not long after his shift from the chemistry department to the production line, at the late H. S. Firestone's request, that Thomas became, in turn, foreman and factory superintendent. In 1916 he was elected a director of the company; in 1919, a vice president; in 1932, president; in 1938, president and chief executive; and finally in 1942, chairman and chief executive. In 1946, Mr. Thomas retired from active management and was named honorary chairman, continuing to act as consultant and adviser, still occupying an office in the Firestone research laboratory, his prize creation.

Despite the pressure of Mr. Thomas's regular work at Firestone, he also found time to serve as a member of the University of Akron's board of directors and was its chairman for 16 years. He also created four university scholarships for Boy Scouts. He served, moreover, for years on the board of the Akron City Hospital.

The deceased was born on a farm in Tallmadge, O., November 18, 1880. He attended Tallmadge Township School, won a scholarship to Buchtel Academy, Akron, where he was graduated in 1900, and then worked his way through Buchtel College, now the University of Akron, where he was president of his class and captain of the football team. In 1904 he was graduated with a bachelor's degree in chemistry.

Of the many honors bestowed on John W. Thomas were the Gold Medal of the American Institute of Chemists in 1945 and an honorary degree of Doctor of Science, by the University of Akron.

Mr. Thomas was also a member of the Society of Automotive Engineers, the Firestone Country Club, and the Portage Country Club.

The deceased leaves his wife, two sons, three daughters, 13 grandchildren, and two brothers.

Services were held November 28 at West Congregational Church, followed by burial in Rose Hill Cemetery.

James A. Rafferty

JAMES A. RAFFERTY, 65, vice president and a director of Union Carbide & Carbon Corp., New York, N. Y., and an important contributer to the government's wartime synthetic rubber and atomic energy programs, died December 19 in Fort Lauderdale, Fla., after a brief illness.

Born in Chicago, Ill., Mr. Rafferty was educated in the Chicago schools, St. Ignatius College, and Lewis Institute of Technology, from which he received a mechanical engineering degree in 1908.

After working as chief chemist for the Peoples Gas, Light & Coke Co., Chicago, he joined the Linde Air Products Co. in 1917, where he rapidly rose to the position of works manager. In 1920 he was named general manager of Union Carbide's newly formed Carbide & Carbon Chemicals Corp. He was elected a vice president of Carbide & Carbon in 1924 and the next year a vice president of Linde Air Products Co. In 1929 he was made president of Carbide & Carbon Chemicals Corp., in 1939 president of Bakelite Corp., and in 1944 chairman of the board of both these companies. Besides these positions, Mr. Rafferty has held other top positions in Union Carbide and subsidiary companies, being elected vice president of Union Carbide & Carbon in 1938, a director in 1941, and a member of the executive committee in 1944.

Among honors bestowed upon the deceased were an honorary degree of Doctor of Engineering from Illinois Institute of Technology (1944) and the SCI Chemical Industry Medal (1948).

A trustee of Illinois Institute of Technology, James Rafferty belonged to the American Chemical Society, Chemists', Uptown, Union League, and Westchester Country Clubs.

Mr. Rafferty leaves a wife, two sons, four daughters, four brothers, two sisters, and 11 grandchildren.

A Requiem Mass was sung December 24 at the Church of the Resurrection, Rye, N. Y., where he lived, followed by interment at the Gate of Heaven Cemetery, Hawthorne, N. Y.

Maurice E. Nye

MAURICE EUGENE NYE, 46, vice president of The Nye Rubber Co., Barberton, O., died December 12 of a heart ailment, at his home in Akron, O.

A holder of many patents, with several pending at the time of his death, Mr. Nye acquired most of his knowledge of machinery and tools and their appliance through experience, having worked with National Rubber Machinery Co., The B. F. Goodrich Co., and Firestone Tire & Rubber Co.

The deceased was a member of the Masons and the Akron Power Squadron.

He was born in Akron on June 27, 1905 and attended local grade and high schools.

Funeral services were held December 15 at the Schermsser Funeral Home, Akron; then the body was brought to Cleveland for cremation.

Survivors include his parents, his wife, two sons, one daughter, and one brother.

Arthur B. Ray

ARTHUR B. RAY, sales manager of the special products division, Carbide & Carbon Chemical Co., New York, N. Y., and an authority on activated carbon and many phases of inorganic, physical, and industrial chemistry, died suddenly December 24 at Port Washington, L. I., where he resided.

After starting in 1919 as a research chemist with National Carbon Co., a division of Union Carbide & Carbon Corp., Dr. Ray also became associated with Carbide & Carbon Chemicals Co., another subsidiary.

In the educational field, he served as instructor and later associate professor of natural sciences and chemistry at Wake Forest College, Blue Ridge College, Cornell University, and the Agricultural & Mechanical College of Texas.

The deceased was born in Leaksville, N. C., on September 12, 1889. He received both his bachelor's and master's degrees from Wake Forest College and his Ph.D. from Cornell.

Dr. Ray was a member of the American Chemical Society, American Institute of Chemical Engineers, and the American Section of the Society of the Chemical Industry. He was also a director of the Armed Forces Chemical Association, having served as captain in the chemical warfare service in World War I. His clubs included the Chemists, New York, and the North Hempstead Country Clubs.

He is survived by his wife, two daughters, and four grandchildren.

Funeral services were scheduled for December 27 at the Fairchild Funeral Home, Manhasset, L. I., with interment in the family plot in Raleigh, N. C.

John K. Hough

JOHN K. HOUGH, advertising director of Goodyear Tire & Rubber Co., Akron, O., died December 29 after a three weeks' illness.

Born in Erie, Pa., on March 12, 1891, Mr. Hough was graduated from Amherst College.

In 1914 the deceased joined Goodyear, working in the dealer sales department at Akron, soon after leaving for Jacksonville, Fla., where he served as salesman and district sales supervisor before returning to Akron to become manager of tube sales. He next served in Boston as service manager; in 1919 he was named manager of auto tire sales at Los Angeles and in 1926 was appointed sales manager of Goodyear-California, serving in that capacity until 1934, when he transferred to Akron to become assistant manager of tire sales. Leaving the States to go to England, Mr. Hough in 1935 was elected assistant managing director of The Goodyear Tyre & Rubber Co. of Great Britain, Ltd., at Wolverhampton, and the following year was promoted to managing director of Goodyear-Wolverhampton. He returned to Akron in 1937, where he served as advertising director of Goodyear until his death.

Mr. Hough, a 32nd degree Mason, was a member of a number of Masonic orders including the Knights Templar and Shrine, and of Phi Kappa Psi. He had also been president of both the Akron Rotary and the Akron Advertising Clubs.

Funeral services were held in Akron on December 31, followed by interment in Rose Hill Cemetery.

Surviving are his wife, a son, two daughters, and two sisters.

Russell A. Firestone

Russell A. Firestone

RUSSELL ALLEN FIRESTONE, second son of the late Harvey S. Firestone, founder of the Firestone Tire & Rubber Co., Akron, O., and a director of that company since 1932, died after a prolonged illness, at his New York, N. Y., residence, on December 12.

Mr. Firestone was born in Akron, December 3, 1901. He attended Henry Grade School, Asheville School, Phillips Exeter Academy as well as Princeton University.

Following graduation in 1924, Russell Firestone joined the staff of his father's company. Since then he has been closely associated with expansions in the operations of the organization. In 1927, as a representative of the company, he broke ground for the new Firestone plant at Los Angeles, Calif., and in 1932 became general manager of the company's newly created mechanical rubber goods division at Akron; he held that position until 1939. In 1942 he was chosen general manager of the Nebraska Defense Corp., a Firestone subsidiary, and supervised construction and first operations of the bomb loading plant near Omaha. The following year he returned to Akron as assistant treasurer of the parent company. He was also a vice president of the Firestone bank and was elected a director there in 1930.

The deceased, long identified with the Firestone farm activities program, has taken an active interest in National 4-H Club work, the Future Farmers of America, and many other youth movements. He was a breeder of thoroughbred horses and a director of the Metropolitan Jockey Club, the Hialeah Park Race Course, and the Saratoga Association. In 1944 and 1945, Russell Firestone served as a vice president of the National Victory Garden Institute and in 1946 was elected a vice president of the peacetime version of that organization, National Garden Institute.

An active church member, Mr. Firestone served as senior warden of St. Paul's Episcopal Church in Akron.

Funeral services were held December 14 at Harbel Manor, his mother's home in Akron, followed by a brief graveside service at the family plot at Columbiana, O.

Surviving are his wife, two sons, his mother, and four brothers, Harvey S., Jr., Leonard K., Raymond C., and Roger S. Firestone, all of whom hold executive positions in the vast Firestone organization.

James V. Blake

JAMES VINTON BLAKE, crude rubber broker until his retirement more than 19 years ago, died December 27 at his home in Fairlawn, O., after many years of failing health.

He was born in Frederick County, Md., 72 years ago. Mr. Blake was graduated from Kenyon College in 1900. He belonged to Phi Beta Kappa and Beta Theta Pi.

In 1901 he joined The B. F. Goodrich Co., Akron, O., spending two years in the factory, seven years at the Detroit sales agency, and one year at the company's branch in Cincinnati. In 1911 he returned to Akron, and until 1916 was employed by the National Blank Book & Supply Co. Next Mr. Blake joined the crude rubber department of Goodyear Tire & Rubber Co., eight months later was sent to Singapore and Ceylon as a buyer of crude rubber, and in 1918 returned to Akron, where he remained in Goodyear's crude rubber and purchasing department until he established his own crude rubber business in May, 1923.

The deceased was a prominent member and vestryman of Church of Our Saviour, where his body laid in state on December 29, followed by services and burial in Rose Hill Burial Park.

Mr. Blake leaves a wife, two daughters, six grandchildren, and a sister.

Edgar B. Davis

EDGAR B. DAVIS, one of the pioneers of the rubber plantation industry in the Far East, died in Galveston, Tex., in October, 1951. Funeral services were held in Luling, Tex., which has been Mr. Davis's residence in recent years.

Mr. Davis became very active in the field of plantation rubber in the Far East from 1910 on and was one of the men responsible for the establishment of the plantations of the United States Rubber Co. in Sumatra. He was in charge of these plantations for that company during the period 1916-1919. Mr. Davis remained active in the rubber field until 1930, at which time he visited Europe with F. A. Seiberling, then president of The Rubber Manufacturers Association, Inc., in connection with the matter of greater cooperation between the producers and users of natural rubber.

The deceased was born in Brockton, Mass., in 1870 and was educated in the public schools of that community. He was employed in the factory of the C. A. Eaton Shoe Co. for several years and eventually became the treasurer of that company. Mr. Davis also became interested in the oil business in Texas in the middle 20's.

He is survived by two nephews.

John F. Segelcke

JOHN F. SEGELCKE, sales manager of the organic acids and plasticizers department, industrial chemicals division, American Cyanamid Co., New York, N. Y., died suddenly December 1 at his home in Teaneck, N. J.

Mr. Segelcke joined Cyanamid in 1921. He attended Columbia and New York universities and was a member of the Phthalic & Maleic Anhydride Industry Advisory

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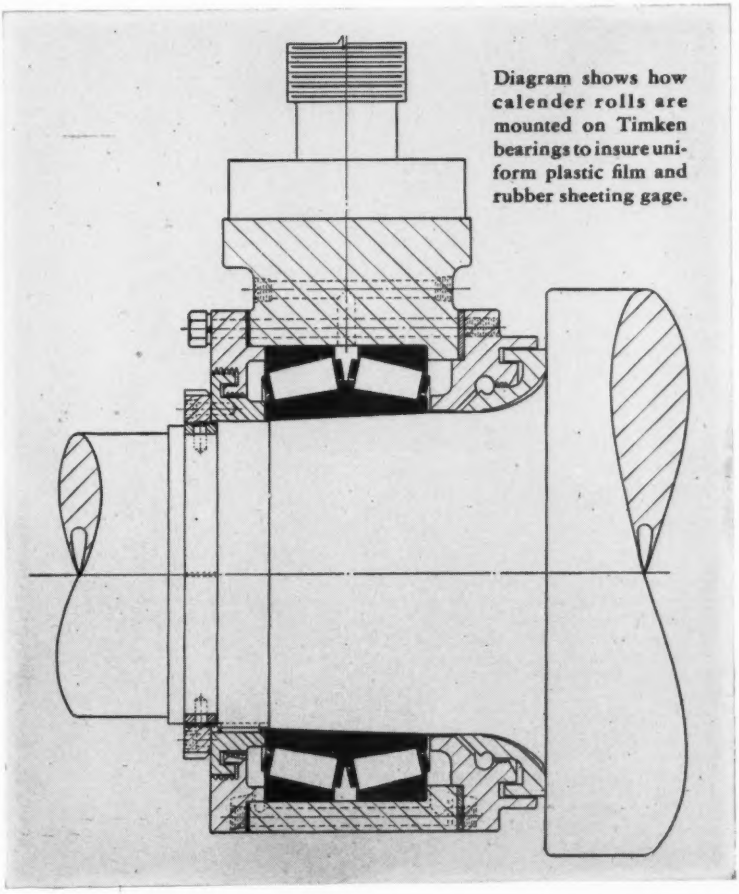

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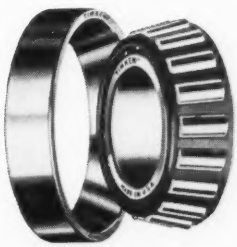

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

Committee of the National Production Authority and a member of the Synthetic Organic Chemical Manufacturers Association of the United States.

He is survived by his wife.

James F. MacKey

JAMES FIELDS MACKEY, 34, manager of product evaluation of Sid Richardson Carbon Co., Fort Worth, Tex., died November 27, of poliomyelitis. He received his bachelor of chemistry degree from Northwestern University in 1939 and worked several years with Dryden Rubber Co. and Printing Arts Research Laboratories. Joining Continental Carbon Co. in 1941, he rapidly rose to chief chemist and held that position until joining Sid Richardson in March, 1951. He made contributions to an understanding of the behavior of carbon black in GR-I and reclaim rubbers and also to the effect of carbon black on the electrical conductivity of tire treads. He was a member of the American Chemical Society, American Association for the Advancement of Science, and the American Gas Association.

WEST

New Stauffer Plant

Stauffer Chemical Co., 636 California St., San Francisco, Calif., plans a plant at Louisville, Ky., for the production of anhydrous hydrogen chloride, carbon tetrachloride, and perchlorethylene. The process, developed by Stauffer's chemists and engineers, consists of chlorinating a hydrocarbon gas. By varying the process slightly, other organic products may be obtained; for the present, however, only the above three will be made.

The hydrogen chloride will be used locally in the manufacture of neoprene, and the carbon tetrachloride in the manufacture of Freon for refrigeration, aerosols, and other purposes.

The plant site chosen by Stauffer, near the Ohio River, will accommodate not only the present program, but also expansion into the manufacture of other chemicals as the need for them develops.

This will be the seventh new plant built by Stauffer since the last war, not including several major plant expansions.

National Rubber Machinery Co., Akron 8, O., has been appointed Midwest distributer of the Randall Duster, made made by the Randall Duster Corp., New York, N. Y. Made in three models, the dusters have proved to be a new advance in the dry spraying of powders. These devices use extremely low air pressure and bone-dry air as the carrier and apply only the correct amount of dust, thus eliminating the need of collectors, blowers, or exhaust recovery systems. NRM will distribute the dusters in Ohio, Indiana, Illinois, and Michigan, as well as the Province of Ontario, Canada.

Monsanto Appointments

Monsanto Chemical Co., St. Louis, Mo., on December 14 announced new assignments for sales personnel of its plastics division at Springfield, Mass.

Wm. J. Fitzgerald has been assigned to thermosetting molding powder sales, and Stanley R. Melvin, to thermoplastic molding powder sales, both in the Chicago area.

H. Walter Miller is transferring from Chicago to Springfield to handle sales of thermoplastic molding powder materials in the New England area.

Winston H. Richter is now at the Springfield office to handle special sales work on all products.

Mr. Fitzgerald, since July, 1950, was a field representative in the plastics division's advertising and sales promotion department. Prior to becoming affiliated with Monsanto in 1950, he was employed by General Electric, Plastic Wire & Cable, and the Prolon Division of Prophylactic Brush Co. He is a member of the Society of Plastics Engineers.

Mr. Melvin, upon his discharge from the Army as a major, joined Monsanto as a process investigator and, prior to becoming a technical sales representative in 1949, served as a shift supervisor.

Mr. Miller in 1943 joined Laucks, Inc., later acquired by Monsanto. Since 1949 he has been at the company's Chicago sales office.

Mr. Richter has been a member of Monsanto's sales department for the past seven years.

Thomas J. Martin it was later announced, has been appointed sales manager of resins for the plastics division. Mr. Martin recently resigned after six months as chief of the thermosetting unit, plastics section of the National Production Authority's chemical division. He first started with Monsanto in 1937 as a research chemist and following service as technical representative in New England and the Northwest was named branch manager of the plastics division's St. Louis sales office. In 1948 he was transferred to Detroit as branch manager of the plastics sales office there.

Harold D. Woodmansee succeeds Martin at Detroit and will be responsible for all plastics sales activities in the area covering Ohio, Michigan, and parts of other adjoining Midwest states. Woodmansee joined Monsanto in 1932 and held several positions in the plant prior to becoming night superintendent in 1937. He was superintendent of the thermoplastic molding materials department from 1939 until 1944, when he became a salesman in the Chicago office. Early in 1947, he was transferred to the Detroit sales office.

Ronald H. Burnett has been appointed purchasing agent of the plastics division, replacing Kenneth W. Short, who will become purchasing agent and traffic manager of the division's plant now under construction at Cincinnati, O. These two appointments are effective February 1.

Burnett started at Monsanto's Nitro, W. Va., plant in 1937 as an hourly employe. He was transferred to the purchasing department there in 1939 and by 1942, when he left for a three-year tour of duty in the United States Navy, had advanced to assistant purchasing agent. He became plant purchasing agent in January, 1947, and was transferred to St. Louis as coordinator of priorities in 1951.

Short joined the receiving department of Fiberloid Corp., predecessor of Monsanto's plastics division, in 1924. He served successively as stock clerk, senior buyer, and assistant purchasing agent prior to his appointment as purchasing agent in 1948.

Opens Sales Offices

Ball Brothers Co., Muncie, Ind., last month opened a new rubber products division sales office in the Curtis Bldg., 2842 W. Grand Blvd., Detroit, Mich., with Leo M. Darts, former Firestone Tire & Rubber Co. sales engineer, in charge as district representative. This new office is the second sales branch the company has opened in recent weeks to develop wider markets for Ball mechanical rubber goods.

The first branch was opened in St. Louis, Mo., with Norbert H. Schmelz the representative in charge. Mr. Schmelz formerly represented Johnson Rubber Co. in that area.

Mr. Darts resigned a 10-year association with Firestone to become affiliated with Ball Brothers. He was poined in Detroit by Clifford Hale, who has represented the Ball company in the Detroit territory for the last 15 years.

New Fiber Glass Factory

Pittsburgh Plate Glass Co., Pittsburgh, Pa., plans to purchase a factory at Shelbyville, Ind., as a manufacturing facility for its new fiber glass division. According to Richard B. Tucker, executive vice president, the plant is a 147,000-square foot, one-story structure.

The new division, formed three months ago and headed by J. Hervey Sherts as general manager, picked this site because of proximity to potential markets, adequate transportation facilities, and labor supply, and a minimum of building change necessary to convert the plant to fiber glass manufacture. Mr. Tucker anticipates that the conversion will be completed and that production will commence by early fall.

Two types of fiber glass, strand fiber and super-fine fiber, will be manufactured at the Shelbyville plant, Mr. Tucker stated. When peak production is reached, about 250 persons will be employed.

Super-fine fiber glass has three principal uses—insulation, sound absorption, and flotation—in a wide variety of defense program requirements. Produced as a short fiber in the form of mats, super-fine fiber is used for both insulation and sound absorption in aircraft, military armored vehicles, and automotive applications, as flotation gear, and as thermal and acoustical insulation of hull and engine room space on various types of craft.

Strand fibers are used in the form of yarn as electrical insulation of wires for motors; while chopped strands lend rigidity and strength to plastics. Another major use is in the textile field for non-combustible fabrics.

Thompson-Hayward Chemical Co., 909 Second St. S., Minneapolis, Minn., now is exclusive sales agent in Minnesota and the Twin Cities for all products of The Baker Castor Oil Co., New York, N. Y.

In a dangerous sport like mountain climbing there's no room for mistakes. It takes experience and know-how to reach the top. In business, too, it pays to rely on experience and know-how. For over forty years — and still today — Muehlstein has been the progressive leader in the field of scrap rubber and scrap plastics.

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Long Joins Pioneer

S. M. Suhr, vice president in charge of sales, Pioneer Rubber Mills, San Francisco, Calif., has announced that William S. Long is now manager of the Los Angeles branch.

Mr. Long, after four years in the Royal Navy, entered the industrial rubber field. His early experience was in the export field in Australia, New Zealand, and the Far East. For the past 32 years he has been with a major industrial rubber company, where he has held various technical, production, sales, and executive positions.

The former manager of Pioneer's Los Angeles branch, Harry T. Jackson, has been promoted to assistant general sales manager at San Francisco headquarters.

Pioneer manufactures industrial belting, hose, packing, and related items at its Pittsburg, Calif., factory and maintains distributing centers throughout the United States.

CANADA

Rubber Stocks Up

Canada's combined stocks of rubber—natural, synthetic, and reclaim—on October 31 climbed to 12,458 tons from 8,614 on the corresponding date in 1950; while consumption fell to 6,897 tons from 7,962, the Dominion Bureau of Statistics reports. Domestic production of synthetic and reclaim advanced to 6,405 tons from 5,584.

Month-end inventories of natural rubber were 5,518 tons, as against 3,981 a year ago; synthetic, 4,587 tons, against 3,038, and reclaim, 2,353 tons, against 1,595. Consumption of natural rubber totaled 3,264 tons, against 4,402; synthetic, 2,369 tons, against 2,260; and reclaim, 1,264 tons, against 1,300. Domestic production of synthetic amounted to 6,036 tons, against 5,142, and reclaim 369 tons, against 442.

Dominion Rubber Co., Ltd., Montreal, P.Q., on December 5 entertained more than 175 employes at its long-service banquet at the Mount Royal Hotel. Nine workers received gold pins in recognition of 25 years' service; while six employes were presented with engraved gold watches for having completed 40 years with Dominion. Company President C. C. Thackray made the presentations.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., will redeem on January 31, 1952, all its outstanding 5% cumulative redeemable first preference shares at $25.11 a share.

Canadian Industries, Ltd., Montreal, P.Q., plans building Canada's first plant for the manufacture of polyethylene. Construction of the plant is scheduled to begin this spring on part of a recently purchased 300-acre tract in Edmonton, Alta. Cost is estimated at $13,000,000, and production is expected to begin late in 1953. The Polythene plant will employ more than 200 persons, and its operation will require the daily consumption of about 10,000,000 cubic feet of natural gas, 8,000,000 gallons of water, and 35,000 kilowatt-hours of electricity. John D. Wright, now manager of the firm's Windsor, Ont., chemical plant, will be manager of the new plant.

NEWS ABOUT PEOPLE

Frank S. Malm and his wife left for Cologne, Germany, January 5. Mr. Malm is representing the United States Naval Research Laboratories, radiation division, as engineer-general on a coaxial cable project. Since retiring from the Bell Telephone Laboratories in June, 1950, after 44 years of service with the Bell System, Mr. Malm has been engaged as consulting engineer of Curtiss-Wright Corp., Caldwell, N. J., and The Okonite Co., Passaic, N. J. He has also acted as liaison officer of The Telegraph Construction & Maintenance Co., Ltd., and Submarine Cables, Ltd., of London, England. Mr. and Mrs. Malm will return to America in June.

Frank Wolcott Knowlton, since 1940 assistant secretary of The General Tire & Rubber Co., Akron, O., has been named the company's chief legal counsel, taking over the duties of **Hayes R. Jenkins,** who has been granted an extended leave of absence for reasons of health. Knowlton has been with General since 1929. He is also secretary and director of Thomas S. Lee Enterprises, Inc., and Aerojet Engineering Corp., both General subsidiaries.

Charles M. Hellyer is now vice president and general manager of H. N. Richards Co., 1475 Prospect St., Trenton, N. J., supplier of basic ingredients for the rubber, floor covering, plastic, paint, and ink industries.

Winton L. Slade has been made a section head in the research and development department, United States Asbestos Division, Raybestos-Manhattan, Inc., Manheim, Pa. He was formerly chief chemist of Fremont Rubber Co. and prior to that had been in the development department, mechanical goods division, Goodyear Tire & Rubber Co.

Norman M. Godfrey has been appointed manager of the eastern sales division of Hewitt-Robins, Inc., 370 Lexington Ave., New York 17, N. Y., and will supervise the sales of Hewitt Rubber and Robins Conveyors divisions products in the Boston, New York, Philadelphia, Pittsburgh, and Charleston districts. Since joining the company in 1937 as a draftsman, Godfrey has participated in the design and sale of many Hewitt-Robins products and served as manager of vibrating equipment sales and development prior to moving to the executive offices a year ago in preparation for taking over the direction of the eastern sales division.

John E. Meyer recently joined Herron & Meyer of Chicago, 38 S. Dearborn St., Chicago 3, Ill. agent for American Cyanamid Co. and its Calco Chemical Division; Godfrey L. Cabot, Inc.; General Atlas Carbon Co.; Erie Engine & Mfg. Co.; Heveatex Corp.; and Thomaston Mills. Mr. Meyer, son of Edward T. Meyer, a partner in the firm, is a graduate of Beloit College, which he attended after service in the Navy during World War II.

F. Thatcher Lane, president, Seamless Rubber Co., New Haven, Conn., recently was elected a director of McBee Co.

Hugh L. Wright, formerly personnel manager of Pabco's Raritan, N. J., plant, has been named to succeed **Paul Richmond** as personnel manager of National Motor Bearing Co., Inc., Redwood City, Calif., who was recently transferred to NMB's subsidiary, Arrowhead Rubber Co., Downey, Calif.

Frank O. Holmes, Jr., 1758 10th St., Cuyahoga Falls, O., recently returned from Sweden where he served several years as technical superintendent with Goodyear Gummifabriks AB at Noorköping. Mr. Holmes, associated with Goodyear more than 17 years, and a founder and first president of The Institution of Rubber Technology in Sweden, resigned from Goodyear to become a contact man in this country to serve Swedish and other European firms in the chemical and engineering fields.

G. R. Monkhouse, a 30-year man in Shell companies and presently general manager, western division, Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y., has been elected to the position of vice president, western division. Offices will remain in San Francisco, Calif. Monkhouse began his career with Shell in 1921 as a marketing trainee, served three years in England, four years in India, and 23 years in this country, broken only by wartime service in the U. S. Army. He progressed through various marketing positions with Shell Oil to division manager; became general manager of Shell Chemical's eastern division; and in 1948, general manager of the western division.

Carl Totsch, assistant sales manager of Midwest Rubber Reclaiming Co., East St. Louis, Ill., last month was made sales manager of the company.

Donald C. Howard has been appointed factory representative for the New York Belting & Packing Co. in California, Nevada, and southern Oregon. Mr. Howard has had more than 11 years experience in both production and sales work with such companies as Alexander Film Co., Aircraft Mechanics, Inc., Engineering Laboratories, Inc., and Gates Rubber Co.

James E. MacDonald, Jr., of Goodall Rubber Co., has accepted the chairmanship of the Rubber Division in the current polio appeal of the National Foundation for Infantile Paralysis in Greater New York.

Harry M. Brubaker has been appointed assistant sales manager of the carbon black division of Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. He will occupy offices at 311 Evans Bldg., in Akron, O. Before joining Witco, Mr. Brubaker was with Goodrich's Hycar division, Phillips Chemical Co., and Sid Richardson Carbon Co.

R. Ruffin Cook has been appointed technical assistant to the manager of the resin sales section of The Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. Mr. Cook, formerly in the plastics division of Monsanto Chemical Co., will handle technical matters in Barrett's developing resin-sales program.

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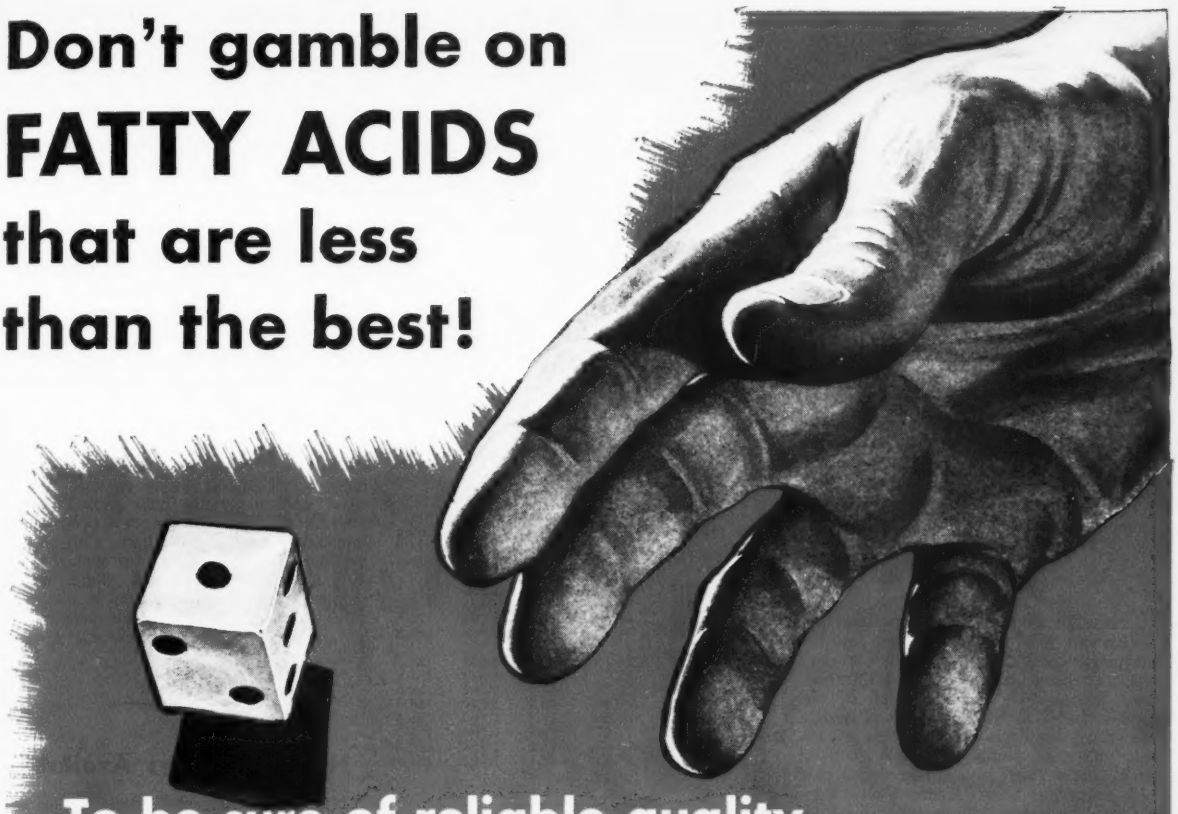

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187 Perry St., Lowell, Mass.
221 N. La Salle St., Chicago 1, Ill.
420 Market St., San Francisco 11, Calif.
Export: 5035 RCA Bldg., New York 20, N.Y.

Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles

Representatives:
Schibley & Ossmann, Inc., 33 Public Square, Cleveland 13, Ohio
Ecclestone Chemical Co., 2673 Guoin, Detroit 7, Michigan

Arthur W. McGuire has been made assistant sales manager of The Arrowhead Rubber Co., Downey, Calif. In this capacity he will work on sales problems in connection with the company's complete line of products, including "O" rings, silicone rubber items, and Airtron fiberglass ducting being produced at the new Long Beach plant. Prior to joining Arrowhead he was sales manager of the aircraft division of Chicago Metal Hose Corp., and for many years McGuire had been with the industrial sales division of Crane Co.

Ben Kaufman, director of public relations of the National Association of Waste Material Dealers, Inc., 271 Madison Ave., New York 16, N. Y., has resigned from the NAWMD staff to enter industry. He joined the organization in 1949.

McPherson, Kline

(*Continued from page* 453)

Materials Division. In his new position Dr. McPherson will be responsible for the coordination and direction of the Bureau's work in calibration, testing, and specifications. Since 1943 he was chief of the Organic and Fibrous Materials Division, supervising research in the fields of organic plastics, dental materials, rubber, textile, leather, and paper. The major part of his work has been concerned with rubber research, including investigations of the electrical, optical, and thermodynamic properties of rubber. A native of Missouri, Dr. McPherson received degrees from Trinity University and the Universities of Texas and Chicago. He started with the NBS in 1918 and became chief of the rubber section in 1930.

Dr. Kline was formerly assistant chief of the Division and chief of the organic plastics section within the Division. He will remain chief of this section for the present; he is known for his researches in the fields of organic plastics, polymerization of olefins, aircraft dopes, and adhesives. Dr. Kline was born in New Jersey and received degrees from Colgate, George Washington, and Maryland universities. He joined the NBS in 1929 and pioneered the work on resins which led to the organization of the organic plastics section under his direction in 1935.

Improving O-Ring Compound

A NEW formulation of synthetic rubber O-ring Compound 90, which supplies properties exceeding the requirements of Army Ordnance Specification AXS 1440, Class "A," has been developed by Parker Appliance Co., Cleveland 12, O. Used in O-ring seals for tanks and other military vehicles, this compound is characterized by superior heat resistance (up to 225° F.), low compression set, and high hardness.

Parker Compound 90 has a tensile strength of 1,450 psi., with no loss of strength after seven days' aging in either air or AXS 808 oil at 158° F. Elongation is 210%, dropping to 150% after aging, but the initial hardness of Shore 90 is unaffected by aging. Volume swell of the stock in the seven-day hot oil test is only 4.6%.

DeBell Abroad

(*Continued from page* 448)

Mr. DeBell described present-day plastics activities in Germany, England, and Japan, pointing out how developments in these countries have been utilized in the United States, while our domestic developments in plastics are also being applied in foreign countries. In commenting on the extraordinary industrial recovery which has taken place in the Western Zone of Germany, the speaker ascribed this to the reestablishment of a sound currency, the relaxation of restrictive controls under the occupation, and the back-to-work movement of the population. While describing the benefits of Marshall Plan and other aid given by this country, Mr. DeBell noted the need of a constructive program that will reduce the amount of aid by this country while increasing productivity and self-sufficiency in Europe.

United States Rubber Industry Employment, Wages, Hours

	Prod. Workers 1000's	Ave. Week Earnings	Ave. Week Hours	Ave. Hour. Earnings	Consumers Price Index
All Rubber Products					
1939	121	$27.84	39.9	$0.745	99.4
1948	209	56.78	39.0	1.456	171.9
1949	186	57.79	38.3	1.509	170.2
1950					
Sept.	215	66.58	41.9	1.589	174.6
Oct.	219	66.29	41.9	1.582	175.6
Nov.	222	66.52	41.5	1.603	176.4
Dec.	222	68.76	41.6	1.653	178.8
1951					
Jan.	222	66.78	40.4	1.653	181.5
Feb.	222	63.37	38.9	1.629	183.8
Mar.	220	65.88	40.0	1.647	184.5
Apr.	219	65.96	40.0	1.649	184.6
May	220	68.56	41.3	1.660	185.4
June	220	71.27	41.9	1.701	185.2
July	218	70.90	41.1	1.725	185.5
Aug.	219	69.95	41.1	1.702	185.5
Tires and Tubes					
1939	54.2	$33.36	35.0	$0.957	
1948	96.2	62.16	37.2	1.671	
1949	83.6	63.26	36.4	1.738	
1950					
Sept.	91.7	75.46	40.9	1.845	
Oct.	92.0	73.12	40.2	1.819	
Nov.	93.4	73.70	40.1	1.838	
Dec.	92.1	76.21		1.910	
1951					
Jan.	91.3	73.69	38.4	1.919	
Feb.	90.6	66.95	35.5	1.886	
Mar.	88.3	71.40	37.6	1.899	
Apr.	87.4	70.15	37.0	1.896	
May	88.3	75.92	39.4	1.927	
June	89.9	82.44	41.7	1.977	
July	90.4	84.43	41.9	2,015	
Aug.	91.6	83.01	41.8	1.986	
Rubber Footwear					
1939	14.8	$22.80	37.5	$0.607	
1948	24.6	51.75	41.8	1.238	
1949	21.6	48.94	38.6	1.268	
1950					
Sept.	21.8	53.95	41.5	1.300	
Oct.	22.8	56.00	42.2	1.327	
Nov.	23.2	54.52	42.0	1.298	
Dec.	23.9	59.34	42.6	1.393	
1951					
Jan.	24.9	57.53	41.6	1.383	
Feb.	25.3	55.87	40.6	1.376	
Mar.	25.0	58.17	41.4	1.405	
Apr.	24.8	59.82	42.1	1.421	
May	25.4	61.48	42.9	1.433	
June	25.7	59.98	42.3	1.418	
July	24.8	54.85	38.9	1.410	
Aug.	25.2	57.24	40.8	1.403	
Other Rubber Products					
1939	51.9	$23.34	38.9	$0.605	
1948	88.1	52.47	40.3	1.302	
1949	80.9	54.38	40.1	1.356	
1950					
Sept.	101.0	61.30	42.9	1.429	
Oct.	104.1	62.48	43.3	1.443	
Nov.	105.0	62.71	42.6	1.472	
Dec.	105.7	64.29	42.8	1.502	
1951					
Jan.	105.8	63.06	41.9	1.505	
Feb.	106.3	61.95	41.3	1.500	
Mar.	106.4	63.13	41.7	1.514	
Apr.	106.3	63.81	41.9	1.523	
May	106.0	64.09	42.5	1.508	
June	104.7	64.47	42.0	1.535	
July	102.3	62.94	41.0	1.535	
Aug.	102.4	61.32	40.5	1.514	

SOURCE: BLS, United States Department of Labor, Washington, D. C.

Making Molding Compounds

GORDON CHEMICAL CO. has begun operation of a new plant in Wilmington, Del., for the manufacture of urea formaldehyde molding compounds and allied chemical products. According to President A. J. Gordon, the new company will market its compounds under the trade name of Uramol. Since it will concentrate exclusively on urea molding compounds, the new organization promises an unusually flexible operation, with prompt attention paid to requests for special colors and formulations. General offices of the company are at the Wilmington plant, but sales in the New York metropolitan area are handled by L. P. Mendoza, Flatiron Bld., New York 10, N. Y.

New Monomers Available

THE first commercial production of two new monomers, ethylene glycol dimethacrylate and diallyl maleate, has been announced by American Monomer Corp., Leominster, Mass. These materials are useful for the production of polyesters, cross-linking agents in copolymerization, resins, rubber chemicals, coatings, drying oils, and pharmaceuticals.

The diallyl maleate is supplied uninhibited and can be used as received. The ethylene glycol dimethacrylate contains inhibition which should be removed for optimum results. Further details regarding purity, boiling point, density, refractive index, and stabilizers can be obtained from the supplier.

The two new monomers are said to show great promise for the development of new plastics and low-pressure laminates.

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arangements.

Export Opportunities

Adriano Ratto, Piazza Vesuvio 9, Milan, Italy: equipment for the manufacture of carbon black from methane gas.

Quimica del Golfo, S. A., Padre Mier 328 Oriente, Monterrey, Mexico: steel, drop-center type of agricultural implement wheels for rubber tires 1-3 inches in diameter and up to four inches thick.

Artin Saghatel Bedros Sanossian, representing Delta Store, Rashid St., Baghdad, Iraq: tires and tubes, toys, clothing.

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Refined Rubbermakers' Sulphur, Tube Brand
"Conditioned" Rubbermakers' Sulphur
Flowers of Sulphur, 99½% Pure
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Carbon Bisulphide
Caustic Soda
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Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber	Com.	$0.75	Dec. 29	Dec. 18
		0.50 sp.	Dec. 29	Dec. 18
	Pfd.	1.75 q.	Dec. 29	Dec. 18
Armstrong Rubber Co.	A & B Com.	0.25 extra	Dec. 12	Nov. 23
		0.50 q.	Dec. 12	Nov. 23
	4¾% Pfd.	0.59⅜ q.	Jan. 2	Dec. 14
Baldwin Rubber Co	Com.	0.10 extra	Jan. 29	Jan. 15
		0.15 q.	Jan. 29	Jan. 15
Bearfoot Sole Co., Inc.	Cap.	6.00 annual	Dec. 18	Oct. 31
Belden Mfg. Co.	Com.	0.40 q.	Dec. 1	Nov. 17
Boston Woven Hose & Rubber Co.	Pfd.	3.00 s.	Dec. 15	Nov. 30
	Com.	0.75	Feb. 25	Feb. 15
Brown Rubber Co., Inc.	Com.	0.25	Dec. 1	Nov. 19
Brunswick-Balke-Collender Co	Com.	0.50 yr.-end	Dec. 15	Dec. 1
	Pfd.	1.25 q.	Jan. 2	Dec. 20
Canadian General Electric, Ltd.	Com.	4.00 extra	Jan. 1	Dec. 14
		2.00 q.	Jan. 1	Dec. 14
Canadian Tire Corp., Ltd	Com.	0.30 q.	Dec. 1	Nov. 20
Circle Wire & Cable Corp	Com.	0.30 extra	Dec. 26	Dec. 12
		0.30 q.	Dec. 26	Dec. 12
Collins & Aikman Corp	Com.	0.15 extra	Dec. 1	Nov. 16
		0.25	Dec. 1	Nov. 16
Crown Cork & Seal Co., Inc	Com.	0.25 yr.-end	Dec. 21	Dec. 3
		0.25 q.	Nov. 28	Nov. 7
Crown Cork International Corp	$1.00 Cl. A.	0.15 extra	Jan. 2	Dec. 17
		0.25 q.	Jan. 2	Dec. 17
		0.25 q.	Apr. 1	Mar. 10
	Cl. B.	0.15 extra	Dec. 28	Dec. 17
	Cl. B.	1.00	Dec. 28	Dec. 17
Dayton Rubber Co.	Com.	0.50	Jan. 25	Jan. 10
	Cl. A.	0.50 q.	Jan. 25	Jan. 10
Detroit Gasket & Mfg. Co.	Com.	0.25	Jan. 25	Jan. 10
Denman Tire & Rubber Co.	Com.	0.05 extra	Dec. 27	Dec. 20
		0.10 q.	Dec. 27	Dec. 20
	Pfd.	0.12½ q.	Dec. 27	Dec. 20
De Vilbiss Co	Com.	0.25 extra	Dec. 20	Dec. 10
		0.25 q.	Jan. 21	Jan. 10
Dewey & Almy Chemical Co.	Com.	0.30	Dec. 20	Dec. 10
Dunlop Tire & Rubber Goods Co., Ltd.	5% Cum. Pfd.	2½%	Dec. 31	Dec. 17
	Com.	1.00	Dec. 21	Nov. 29
E. I. du Pont de Nemours & Co., Inc.	$4.50 Pfd.	1.12½ q.	Jan. 25	Jan. 10
	$3.50 Pfd.	0.87½ q.	Jan. 25	Jan. 10
Endicott Johnson Corp	Com.	0.40 q.	Jan. 2	Dec. 20
	4% Pfd.	1.00 q.	Jan. 2	Dec. 20
Firestone Tire & Rubber Co.	Com.	1.00 extra	Dec. 1	Nov. 15
		0.75 init.	Jan. 21	Jan. 4
	4½% Pfd.	1.12½ q.	Dec. 1	Nov. 15
Flintkote Co	Com.	1.00 yr.-end	Dec. 10	Nov. 26
		0.50 q.	Dec. 10	Nov. 26
	$4.00 Pfd.	1.00 q.	Dec. 15	Dec. 1
Garlock Packing Co	Com.	0.50 extra	Dec. 27	Dec. 14
		0.25 q.	Dec. 27	Dec. 14
General Cable Corp.	Com.	0.55	Dec. 17	Dec. 14
	1st Pfd.	1.00 q.	Jan. 2	Dec. 7
	2nd Pfd.	0.50 q.	Jan. 2	Dec. 7
General Electric Co.	Com.	0.75	Jan. 25	Dec. 21
General Tire & Rubber Co.	Com.	0.50 q.	Nov. 30	Nov. 20
		1.50 extra	Nov. 30	Nov. 20
	4½% Pfd.	1.06¼ q.	Dec. 31	Dec. 21
	3¾% Pfd.	0.93¾ q.	Dec. 31	Dec. 21
	3¼% 2nd Cv. Pfd.	0.81½ q.	Dec. 31	Dec. 21
General Motors Corp.	Com.	1.00	Dec. 10	Nov. 15
	$5.00 Pfd.	1.25 q.	Feb. 1	Jan. 7
	$3.75 Pfd.	0.93¾ q.	Feb. 1	Jan. 7
Goodall-Sanford, Inc.	Com.	0.37½	Dec. 1	Nov. 15
Goodyear Tire & Rubber Co.	Com.	0.75 q.	Mar. 15	Feb. 15
	$5 Pfd.	1.25 q.	Mar. 15	Feb. 15
B. F. Goodrich Co.	Com.	0.50	Dec. 31	Dec. 7
	Pfd.	1.25 q.	Dec. 31	Dec. 7
Hewitt-Robins, Inc.	Com.	0.50	Dec. 15	Nov. 30
Intercontinental Rubber Co	Com.	0.20	Dec. 27	Dec. 10
Jenkins Bros.	Fdrs.	1.00	Dec. 27	Dec. 20
		3.00 extra	Dec. 27	Dec. 20
	Non-Vot.	0.25	Dec. 27	Dec. 20
		0.75 extra	Dec. 27	Dec. 20
Johns-Manville Corp.	Com.	1.25	Dec. 13	Dec. 3
		0.75	Dec. 13	Dec. 3
Johnson & Johnson	Com.	0.25	Dec. 11	Nov. 23
	Pfd. B	0.87½ q.	Feb. 1	Feb. 1
	Pfd. C	1.00 q.	Feb. 1	Feb. 1
I. B. Kleinert, Rubber Co.	Com.	0.25	Dec. 12	Nov. 28
Lee Rubber & Tire Corp.	Com.	0.75 q.	Feb. 1	Jan. 21
Mansfield Tire & Rubber Co.	Com.	0.25 extra	Dec. 20	Dec. 10
		2.50 yr.-end	Dec. 20	Dec. 10
		0.25 q.	Dec. 20	Dec. 10
	Pfd.	0.30 q.	Jan. 2	Dec. 15
Midwest Rubber Reclaiming Co., Inc.	Com.	0.25 q.	Jan. 1	Dec. 7
Minnesota Mining & Mfg. Co.	Com.	0.25	Dec. 12	Nov. 23
	Pfd.	1.00 q.	Dec. 12	Nov. 23
Mohawk Rubber Co.	Com.	0.50 extra	Dec. 31	Dec. 14
		0.25 q.	Dec. 31	Dec. 14
National Motor Bearing Co., Inc	Com.	0.40 q.	Dec. 28	Dec. 17
Okonite Co	Com.	5% stk.	Dec. 1	Nov. 15
		0.50	Feb. 1	Jan. 15
O'Sullivan Rubber Corp	5% Cum. Pfd.	0.50 accum.	Jan. 1	Dec. 15
Phelps Dodge Corp	Com.	1.25 extra	Dec. 10	Nov. 19
		1.25	Dec. 10	Nov. 19
Plymouth Rubber Co., Inc	Com.	0.12½	Dec. 15	Nov. 30
Raybestos-Manhattan, Inc.	Com.	1.50	Jan. 2	Dec. 10
Rome Cable Corp	Com.	5% Stk.	Nov. 19	Nov. 2
		0.25	Dec. 26	Dec. 5
	Pfd.	0.30 q.	Jan. 2	Dec. 5
Seiberling Rubber Co	Com.	0.25 q.	Dec. 20	Dec. 1
	4½% Pfd.	1.12	Jan. 1	Dec. 1
	5% Pfd. A	1.25	Jan. 1	Dec. 1
A. G. Spalding & Bros., Inc.	Com.	0.50 extra	Dec. 14	Dec. 7
		0.25 q.	Dec. 14	Dec. 7
Thermoid Co.	$2.50 Pfd.	0.62½ q.	Feb. 1	Jan. 10
Union Asbestos & Rubber Co	Com.	0.25 q.	Jan. 2	Dec. 10
United Elastic Corp.	Com.	0.60	Dec. 10	Nov. 15
United States Rubber Co	Com.	2.00	Dec. 10	Nov. 19
	8% Non-Cum. Pfd.	2.00	Dec. 10	Nov. 19
U. S. Rubber Reclaiming Co.	Pfd.	0.35 q.	Jan. 2	Dec. 21

CALENDAR

Jan. 14-17. Plant Maintenance Show. Convention Hall, Philadelphia, Pa.

Jan. 16. Washington Rubber Group. Potomac Electric Power Co. Auditorium, Washington, D. C.

Jan. 16-18. Society of Plastics Engineers. National Technical Conference. Edgewater Beach Hotel, Chicago, Ill.

Jan. 20-24. National Sporting Goods Assn. Convention and Show. Morrison Hotel, Chicago, Ill.

Jan. 24. Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

Jan. 25. Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.

Feb. 1. Akron Rubber Group. Mayflower Hotel, Akron, O.

Feb. 5. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.

Feb. 7. Northern California Rubber Group.

Feb. 8. Chicago Rubber Group. Program on Plant Safety & Material Handling.

Feb. 13. Chicago Section, SPE, and Midwest Chapter, SPI. Builders Club, Chicago, Ill.

Feb. 15. Detroit Rubber & Plastics Group.

Feb. 16-24. National Sportsmen's & Vacation Show. Grand Central Palace, New York, N. Y.

Feb. 20. Washington Rubber Group. New York Section, SPE. Hotel Gotham, New York, N. Y.

Feb. 21-22. The Society of the Plastics Industry (Canada) Ltd. Tenth Annual Conference. Royal York Hotel, Toronto, Ont., Canada.

Mar. 1-31. The 1952 Red Cross Fund Campaign.

Mar. 3-7. American Society for Testing Materials. Spring Meeting and Committee Week. Statler Hotel, Cleveland, O.

Mar. 4. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.

Mar. 6. Northern California Rubber Group.

Mar. 11-14. The Society of the Plastics Industry, Inc. Fifth National Plastics Exposition. Convention Hall, Philadelphia, Pa.

Mar. 12. Newark Section, SPE. Military Park Hotel, Newark, N. J.

Mar. 19. New York Section, SPE. Hotel Gotham, New York, N. Y. Washington Rubber Group.

Mar. 21. Chicago Rubber Group. Morrison Hotel, Chicago, Ill.

Mar. 22-Apr. 6. Chicago International Trade Fair. Navy Pier, Chicago, Ill.

Mar. 23-27. American Chemical Society. National Meeting. Buffalo, N. Y.

Mar. 27. Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

Apr. 1. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.

Apr. 1-4. American Management Assn. National Packaging Exposition and Conference on Packaging, Packing, and Shipping. Auditorium, Atlantic City, N. J.

Apr. 3. Northern California Rubber Group.

Apr. 4. Akron Rubber Group.

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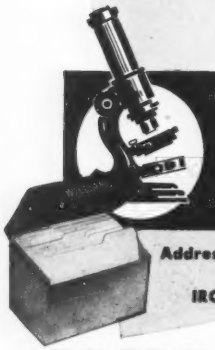

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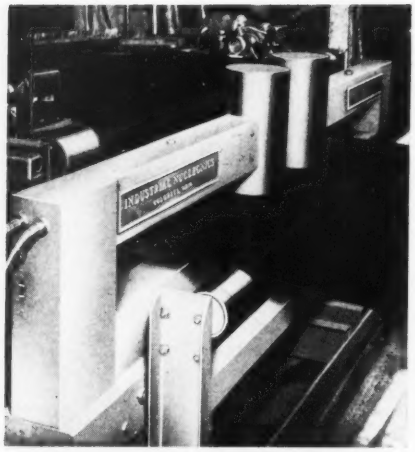

Model R AccuRay Beta Gage for Calendered Materials

Improved Thickness Gage

THE new Model R AccuRay Beta Gage, designed specifically for the continuous measurement of moving materials being calendered in the rubber and plastics industries, has been announced by Industrial Nucleonics Corp., Columbus, O. Like the Model BG-1 gage introduced by the company early last year, the new Model R is a non-contacting radiation gage that provides readings directly in square yard weight with a continuous accuracy of ±1%.

New features of the gage include an automatic control for positioning the measuring unit across the sheet to provide profile readings; a control for the selection of desired weight ranges; a remote-control station with repeat meter which permits gage reading and control from a distant point; and the AccuRay recorder which can be equipped with target and tolerance marking pens to provide a comprehensive working picture of gaging at a glance. Chart marking pens for recording the weight range and sheet position of the gage are also available to provide a permanent record of each roll of processed material. The gage is produced in a size that permits thickness measurements 24, 36, 48, and 60 inches from the edge of the sheet.

Tough?
SEE PAGE 396

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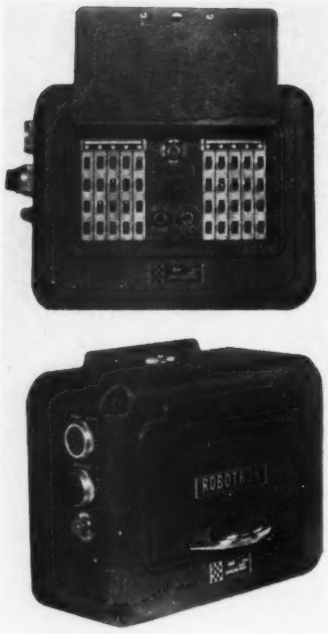


Type E304 Robotron Automatic Cycle Controller for Presses

New Press Controller

A NEW addition to its automatic press cycle controllers, the Type E304 Robotron, has been announced by Emmett Machine & Mfg., Inc., Akron 14, O. The new controller is a compact, press mounted, package unit that will operate a hydraulic press, "bump" or "breathe" the press, and control the length of curing time. Capable of accurate timing and close control of press opening distance, the Robotron E304 features push-button keyboards to set up cycles in a few seconds. From 0-19 bumps can be obtained and variably spaced.

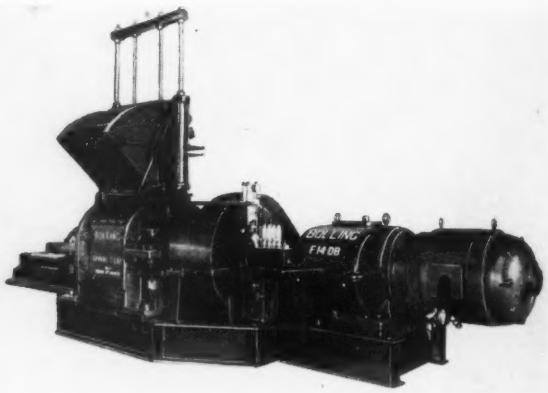
The controller mounts on the right side of the press, with its operating push-buttons and signal light facing the press operator. A cover with provisions for locking encloses all set-up adjustments and prevents tampering. The Type E304 is particularly suited to short bump openings, and the ability to space the bumps properly usually results in a reduced number of bumps, with consequent reduction in wear on the press and hydraulic valves. Rugged electrical control elements, operating through a solenoid valve and built-in pressure switch, contribute to low maintenance and high dependability.

Intensive Mixers for Rubber, Plastics

A NEW line of Spiral-Flow intensive mixers for rubber and plastics has been announced by Stewart Bolling & Co., Inc., 3192 E. 65th St., Cleveland 27, O. The fundamental Spiral-Flow feature of these mixers provides maximum heat transfer by the flow of water or steam through passages equipped with fins or turbulators. These circulation passages are accessible from the outside by removal of the cover plates for cleaning or sandblasting. Because of a two-sided manifold, temperatures can be controlled over a wide range. Two-speed motors are not needed to step up heating for fast breakdown because abundant heat can be generated in the spiral flow sides of the mixer by use of steam.

Each side of the mixer is a single steel casting readily removable without disturbing the frames or rotors. The split

(*Continued on page* 484)



Stewart Bolling Spiral-Flow Intensive Mixer

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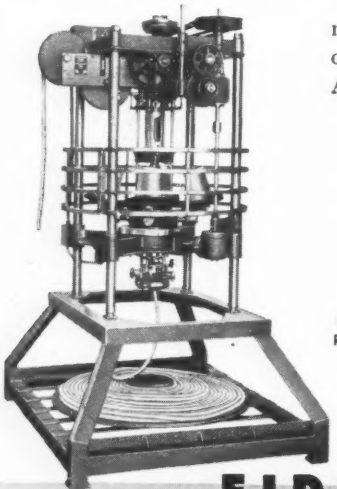

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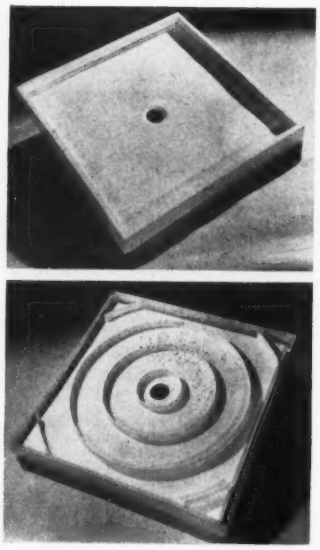


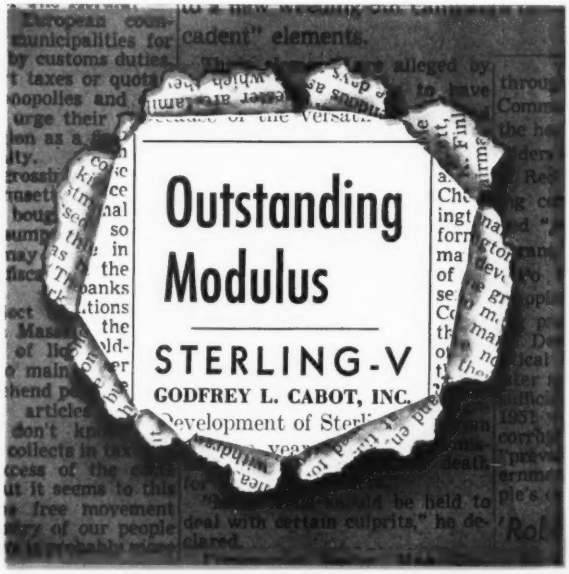
Top and Bottom Views of Molded Plastic Shower-Stall Base

Plastic Shower-Stall Base

A NEW type of reinforced plastic shower-stall base is being marketed by Kaytel, Inc., New York, N. Y. Molded of Fiberglas reinforced Laminac polyester resin, the one-piece seamless construction of the base assures permanently leakproof service and eliminates the need of lead pan insulation, it is claimed. Designated the Tuf-Lite Receptor, the shower base weighs only 20 pounds, as compared with 300-400 pounds for terrazo and 80 pounds for steel, yet is stronger than steel on a weight-for-weight basis.

A simulated basket-weave design is molded into the matte surface of the base to prevent skidding accidents. Available in a range of molded-in colors, the receptors never need refinishing and will not crack, chip, peel, or rust, according to the manufacturer. The plastic surface is comfortably warm to the touch, and the material has sound-absorbing qualities that reduce the noise of pounding under the shower spray.

"Manhattan Expander." Bulletin No. 6918. Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. 4 pages. This illustrated bulletin describes a new three-inch-diameter rubber covered roll-type expander, designed to meet the stretch requirements of every fabric from light rayons to ducks or tire cord fabrics and rolled sheet plastics. Features of the expander include quick and easy adjustment, low maintenance costs, and easy mounting on all types of web handling equipment.



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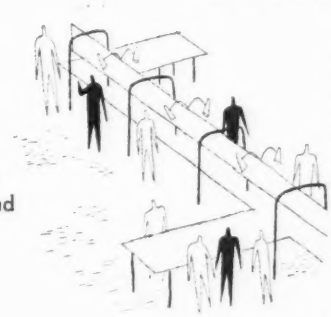

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Imp Plastic Camera Provides Built-in Photographic Services

Unique Plastic Camera

A NEW plastic camera that provides complete photographic service has been announced by Beaurline Industries, St. Paul, Minn. Named the Imp camera, the unit is molded in eight separate parts of Monsanto Chemical Co's Lustrex polystyrene plastic. The camera is supplied already loaded and takes 12 pictures. When all 12 pictures have been taken, a return address and postage are affixed, and the complete camera is dropped into the nearest mailbox for return to the manufacturer. In St. Paul, the pictures are developed, printed, and returned to the sender.

While weighing only five ounces, the camera is sufficiently durable to be mailed in its tight-fitting carton without the use of additional protective packaging. Pre-focused lenses, simple, built-in viewfinder, and fixed shutter speed provide for quick and easy operation of the camera. The unit uses 35-mm. film, and prints made by the Beaurline laboratories are 3¼ inches square in size. Distribution channels have been arranged through regular photographic supply outlets at a flat charge which covers the cost of the films, the use of the camera, and the developing and the printing of the pictures.

Intensive Mixers

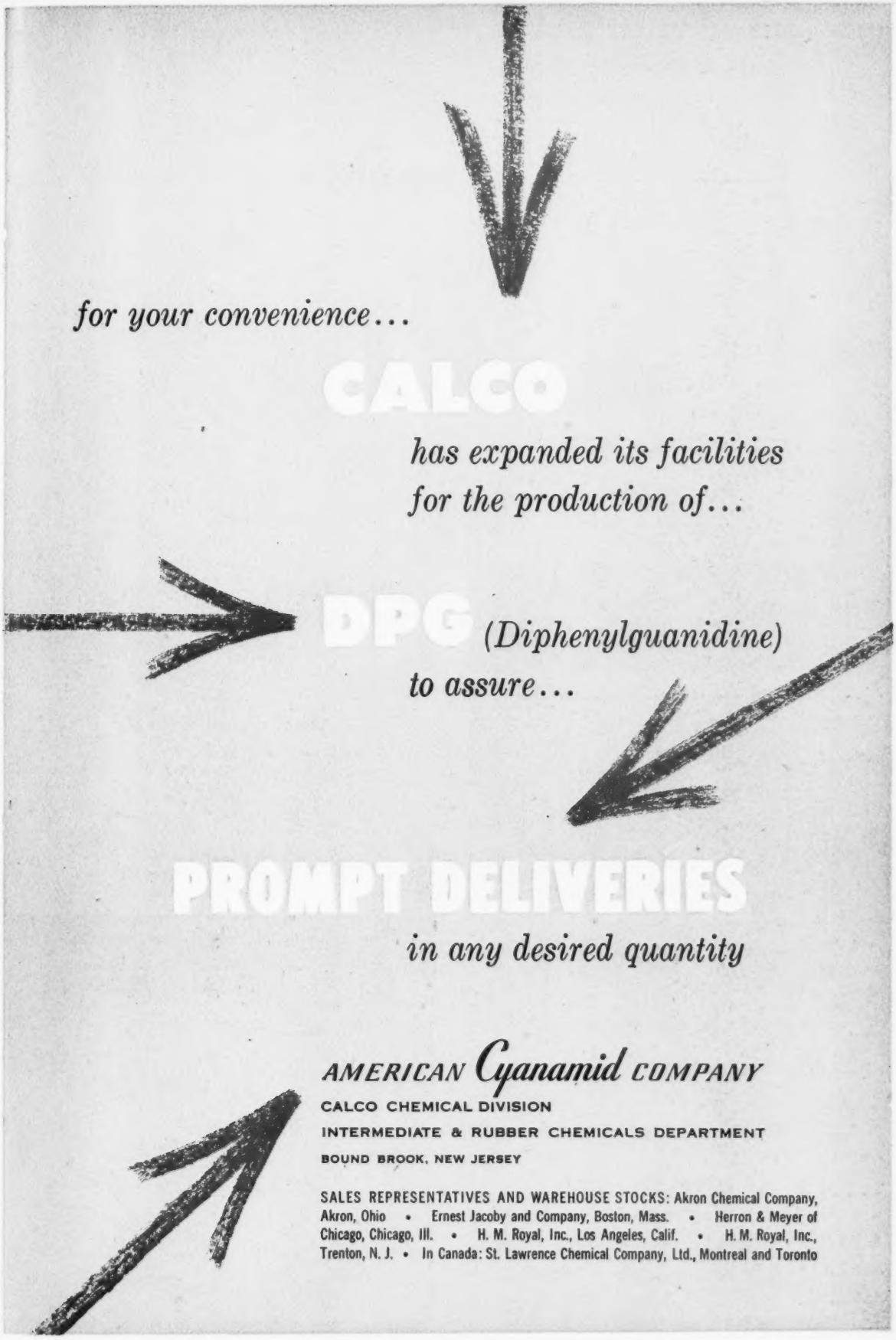
(*Continued from page* 480)

end frames are made of cast steel, and the top half is securely bolted to the bottom half and also to the sides of the mixer. Removing the bolts permits the top halves to be lifted off, thus exposing the rotors, bearings, shroud plates, and dust seals. The rotors, while conventional in flute arrangement and helix, have a new proportion of diameter to length to give better dispersion and fast mixing, and a full-circle end shield. This shield permits close radial running clearances from an axial to a radial position, and anti-friction bearings hold the radial clearances to a negligible minimum. At the rotor ends beyond the shroud plates are effective dust stops. Any material passing by the shroud plates is trapped in a disintegrator placed ahead of the dust seals. The seals are held by fork retainers which can be removed by taking off one nut.

The cast-steel discharge door is a steel casting that is not part of an actuating air cylinder. This door is readily replaceable and is self-adjusting for vertical wear. The new mixers are available in No. 3, No. 4, No. 10, and No. 12 sizes, with chamber capacity ranging from 3,450-16,000 cubic inches; crude rubber capacity ranging from 65-300 pounds; and fast rotor speed ranging from 36-25 rpm.

Ceylon Rubber for Red China

Having once experienced the satisfactions of a successful rubber deal with Red China, Colombo rubber exporters are preparing for further transactions of this kind, and many who had not participated in the first venture are taking steps to get their share in the next. According to the local press, export houses are arranging new shipments for China; one firm is attempting to interest producers and dealers in exporting 50-ton lots of ribbed smoked sheet to China on a cooperative basis. Another was understood to have received an order for 2,000 tons; while a third was said to be in Hong Kong making arrangements for shipment to China of roughly 5,500 tons, or about the same amount as was sent on the first deal.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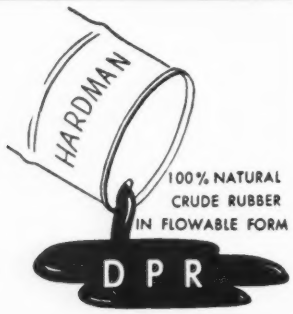

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Decreasing Permeability of Rubber to Gas

In 1949 studies were initiated at the I.F.C.[1] on the effect of fillers on the permeability to gas of natural rubber. Recalling that in earlier tests along similar lines bentonite had given distinctly superior results, the investigators, struck by the idea that this superiority might be due to the lamellar form of the substance, accordingly began to compare the relative permeability of fillers consisting of spherical particles and powdered mica and aluminum which consist of lamellar particles. It was intuitively felt that a fluid attempting to pass through rubber would find a strong barrier in the series of perpendicular obstacles provided by the latter type of particle. With this idea as a starting point, a theory of the action of different types of fillers (with spherical or lamellar particles) was developed, based on the barrier effect of filler particles as they occur in the path of a gas traversing the rubber. The authors explain their theory and their method of determining the permeability coefficients for nitrogen, of rubber mixes containing the usual type of fillers and those having lamellar particles, by which they prove the superiority of the latter.

It appears that the authors were able to reduce gas permeability of a natural rubber mix by more than half by the incorporation of 20% of commercial mica powder; a combination of 50% mica and 50% aluminum powder gave still better results, with permeability reduced to one-third the usual value, while in addition mechanical properties were improved.

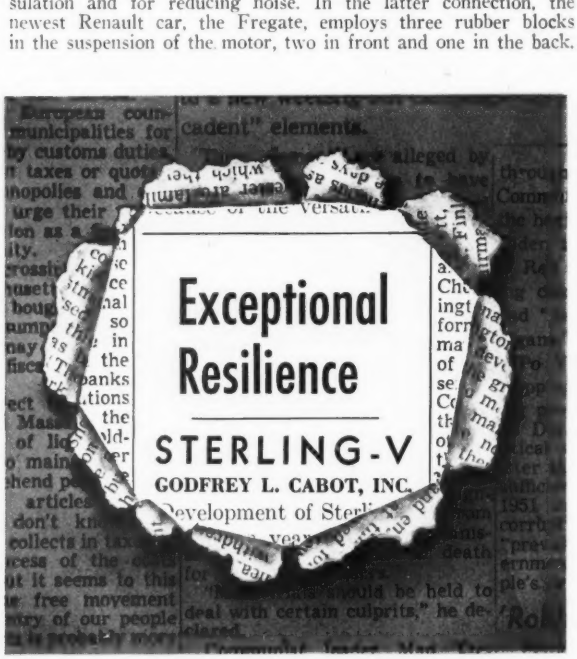
At present, tubes manufactured on a trial scale, with mica and aluminum filler, are undergoing road tests.

Further research is now under way to determine the effect of the degree of orientation and the shape factor, and the possibility is foreseen that even better lamellar fillers than those presently being tested will be developed.

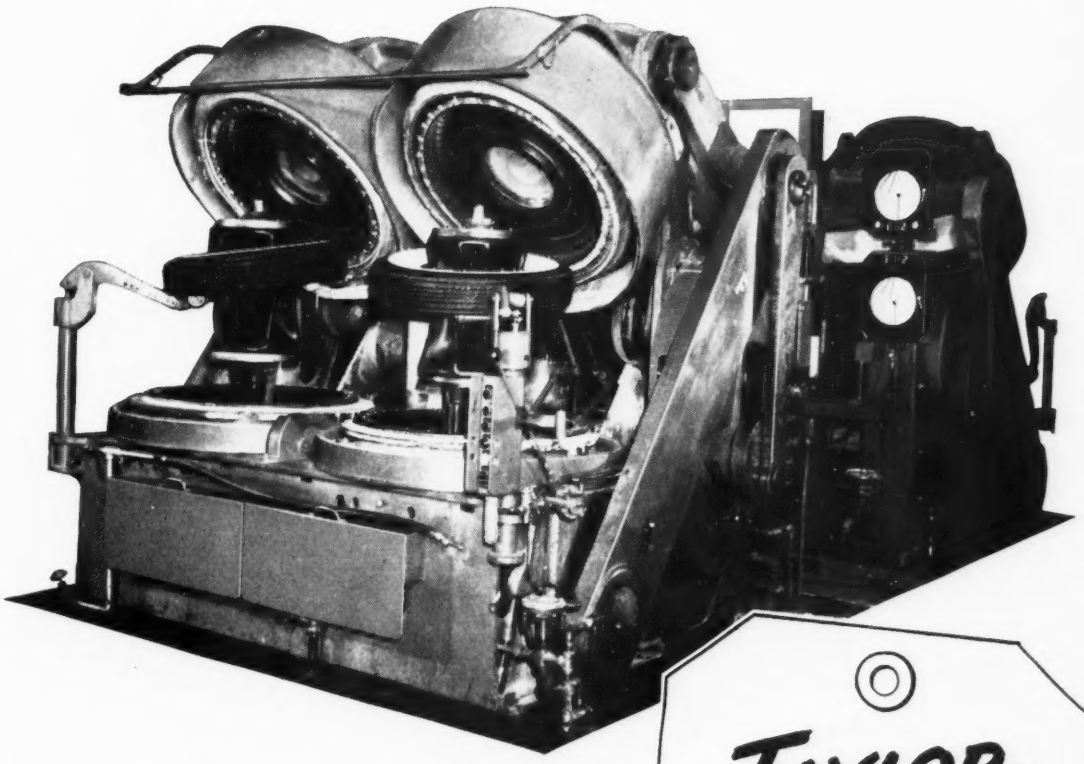
[1] P. Thirion, G. J. Van Amerongen, R. Chasset, *Rev. gén. caoutchouc*, 28, 10, 684 (1951).

Rubber at the Auto Show

While nothing particularly novel was to be seen at the Thirty-Eighth Automobile Show held in Paris this summer, there was evident an increased tendency on the part of car manufacturers to assure greater riding comfort and safety by the suitable use of rubber. Several French makes are now equipped with Dunlopillo upholstery, and rubber is more extensively used as insulation and for reducing noise. In the latter connection, the newest Renault car, the Fregate, employs three rubber blocks in the suspension of the motor, two in front and one in the back.



New Bag-O-Matic Press *saves space and time*



THE NEW McNeil Bag-O-Matic Press combines these complicated operations into one simple process by: **(1)** automatically controlling time and temperature during curing **(2)** automatically "bagging" before vulcanizing and "debagging" after vulcanizing **(3)** and automatically opening the press. When delivered "Taylor-Equipped", as most of them are, they are masterminded by a Taylor FLEX-O-TIMER* Time Cycle Controller, two Taylor Double Duty FULSCOPE* Recording Controllers, and a Taylor Pressure Recorder.

FLEX-O-TIMER (*on back side*) automatically controls sequence and duration of all functions from closing to opening of press. Double Duty FULSCOPE Controllers (*right*) control press temperature and condensate removal in each cavity. Taylor Bi-Record Pressure Gage (*right, below*) records bag pressure to each press.

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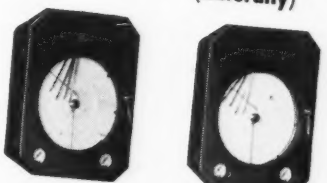
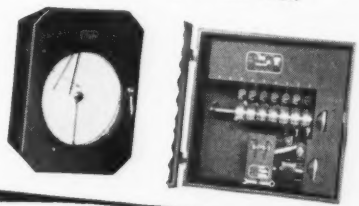


Two Taylor Double Duty FULSCOPE Recording Controllers (*above*) and Taylor Bi-Record Pressure Gage and Flex-O-Timer Time Cycle Controller (*below*) standard-equipped on the new McNeil Bag-O-Matic Press.



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The leading tire manufacturers were well represented and showed their well-known brands: Bergougnan, with the Record passenger-car tire, among others; Michelin, with the Metallic, metal carcass tire; Kleber-Colombes, with tires fitted with butyl inner tubes; Dunlop, with its "Fort" lines; while Englebert followed American design with a new tire having a wide flat tread with movable transverse leaves.

Resin-Reinforced Latex

Valuable results have been obtained at the I.F.C.[1] by the reinforcement of natural rubber latex with synthetic resins formed *in situ* by the introduction into the latex of the first products of resinification. Soluble alkaline resorcinol-formaldehyde resin, which has received special attention, has reportedly endowed latex mixes with properties superior to those known up to now in rubber technology. These exceptional qualities do not appear to be due either to vulcanization by the resin or to a more simple chemical rubber-resin combination, but to the special structure of the rubber-resin mixture.

As a result of this new development, a wide field is expected to be opened for the direct employment of latex for products for which it has hitherto not been used, as belting, tires, tubes, high-quality mechanical parts, etc. Tests in this direction have already been started, and it is thought that the time is not far off when certain reinforced latex articles will be manufactured on an industrial scale.

[1] *Rev. gén. caoutchouc*, 28, 8, 570 (1951).

French Peptizer Now Available

In its new department dealing with compounding ingredients, which is to alternate with another discussing processing equipment, *Revue Générale du Caoutchouc*[1] takes up a peptizing agent of French manufacture. Hitherto France has not produced high-grade peptizing agents, and since these had to be imported, their use is not so general as it should have been.

But recently Societe d'Extraction et de Synthèse Organo-Chimique (ESOC) succeeded in developing the peptizer, Peptax, which, it is claimed, ranks with the high-quality foreign brands. Peptax is a modified phenylhydrazine stearate said to combine with all the properties demanded of a catalytic plasticizer various other good qualities which have never before all been found together in a single product. It is non-toxic—will not attack the skin; it is a rapid peptizer, the efficiency of which depends only to a slight extent on temperature, so that it can be used at all usual processing temperatures; it does not affect mechanical properties of vulcanizates; it is completely and immediately dispersed in the rubbers—are among other claims for this new product.

[1] 28, 11, 766 (1951).

Tough?
SEE PAGE 396

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French Tire Notes

Le Manufacture de Caoutchouc Michelin, in collaboration with the Societe Gènèrale de Traction et d'Exploitations (formerly Cie. du Chemin de Fer Metropolitain de Paris), recently formed Les Vehicules Guides sur Pneumatiques, to produce guided vehicles mounted on pneumatic tires for passenger transportation.

At the September 27 meeting of the Association Francaise des Ingenieurs du Caoutchouc two reports were made on the use of latex in tire manufacture. M. Chassaing described his process of manufacturing cycle tires by gelification of a thermosensitive compound and touched on the possibility of extending the application of the process to automobile tires. In regard to the latter, drying is a delicate problem, which has been solved by operating in moist surroundings and under pressure, at temperatures from 80-120°C.

Next M. Pinazzi reviewed the properties of reinforced latex and the problem of producing tires therefrom on an industrial scale. He suggested direct molding of the latex by gelification in a mold containing the coated, shaped carcass provided with beads, or alternatively a tread of reinforced latex could be put on a normally prepared carcass. Cadmium diethylithiocarbamate has been found satisfactory because of its long curing plateau, but plasticization of the reinforced latex was held to be a ticklish matter. It is hoped, however, to be able to achieve success by plasticizing *in situ* the rubber globules of the latex.

GERMANY

Product Developments Reported

The Budra conveyer belt recently put on the market here, consists of a web of galvanized spring steel wire covered on both sides with a layer of Buna. This development is not completely new since a similar type of belt covered with soft PVC has been in use in Germany since 1941. The Budra belt is said to have a tensile strength of some 400 kg. sq. cm., corresponding to that of a five-ply rubber and fabric belt; it is available in widths of 500, 650, 700, and 800 millimeters and in lengths of 50 meters; it is not endless. About 150,000 meters of this kind of belting is already in use, chiefly in the mining industries.

A new type of railroad track construction over bridges has been taken into service for the first time at Calw. Here the old tracks have been laid on rubber pads instead of the usual gravel bed; the idea is to keep the distance from the lower edge of the bridge to the top edge of the rail as small as possible and to save on overall height. The rails[1] are fixed to the sleeper in the usual way; each sleeper is firmly united to the bridge structure in the center of the track, but where the sleeper passes under the rail it can conform to the flexing of the rubber pad. The latter, vulcanized to a metal plate in the structural concrete, is said to give about three mm. under full load, or the same amount as a good gravel bed yields. Because of its protected position under the sleeper, the rubber pad is expected to last at least 10 years.

Dynamit A.G., Troisdorf, has for some time been marketing Dynagen, a polyisobutylene based sheet material, for use especially as sealing material in underground construction. It is claimed to be completely resistant to decay; can absorb movement of structures because of its elasticity; and can be welded to form homogeneous and impervious covers for large surfaces. *Kunststoffe*[2] carries several illustrations of the various ways in which the material is employed——in sealing excavations for foundations, as a carpet under rails, to form connections and other jointing material for water outlets, and in overhead sealing in a tunnel, with the aid of cold adhesives. Under the working conditions in the latter instance, use of other types of sealing materials for which hot bitumen adhesives are generally employed would have constituted a hazzard for the workmen.

[1] Kautschuk u. Gummi, 4, 10, 364 (1951).
[2] 41, 10, 363 (1951).

Damage to PVC Wire Insulations

In the past, reports O. Leuchs, of the research department of the Felten & Guilleaume-Carlswerk,A.G., Cologne-Muhlheim,[1] damage to the PVC covers of insulated wires were frequently observed of a nature clearly not due to any electrical fault.

[1] *Kunststoffe*, 41, 10, 309 (1951).

The PVC was discolored and disintegrated in places, and in some cases even the metal conductor had been attacked. At the same time it was noted other PVC-insulated conductors used under the same conditions had not been similarly affected. Tests were therefore carried out, based on observations by K. Leilich and K. Ditgens;[2] these investigators had found that such damage occurred only in direct current systems and under very wet conditions; that only the negative pole of the wire was attacked; and they indicated that softeners of the fattty acid ester-type used in preparing mixes with high cold resistance were responsible.

Two series of tests were undertaken by Dr. Leuchs, the first to determine factors affecting water absorption and diffusion through the insulations, and the second on the factors affecting direct current resistance. The samples used fell roughly into four groups: (a) in which the PVC contained emulsifier and electrolyte; (b) PVC without these materials; (c) in which fatty acid ester-type softeners were used; (d) in which other softeners were used.

The results of the first series of experiments indicated that water absorption depends on the type of PVC; while rate of diffusion of water depends on the type of softener. In the second series, in which the resistance to direct current was tested when PVC insulations were acted on by current and water at the same time, damage was due to electrolysis through the insulation, caused by the presence of emulsifiers whose hydrophilic molecules were responsible for a high degree of water absorption. Hence the insulations least resistant to water absorption were also least resistant to direct current. In insulations which readily absorb water, electrolysis is possible at 100° C.; in those in which water at the same time diffuses very rapidly, as for instance, those made from PVC containing an emulsifier and softened by fatty acid esters, electrolysis will take place at room temperature. The extreme susceptibility of the latter compounds is explained by the assumption that the spaces between the molecules in the skeleton of the matted PVC chains are less completely filled by the fatty acid ester molecules than by the molecules of other softeners.

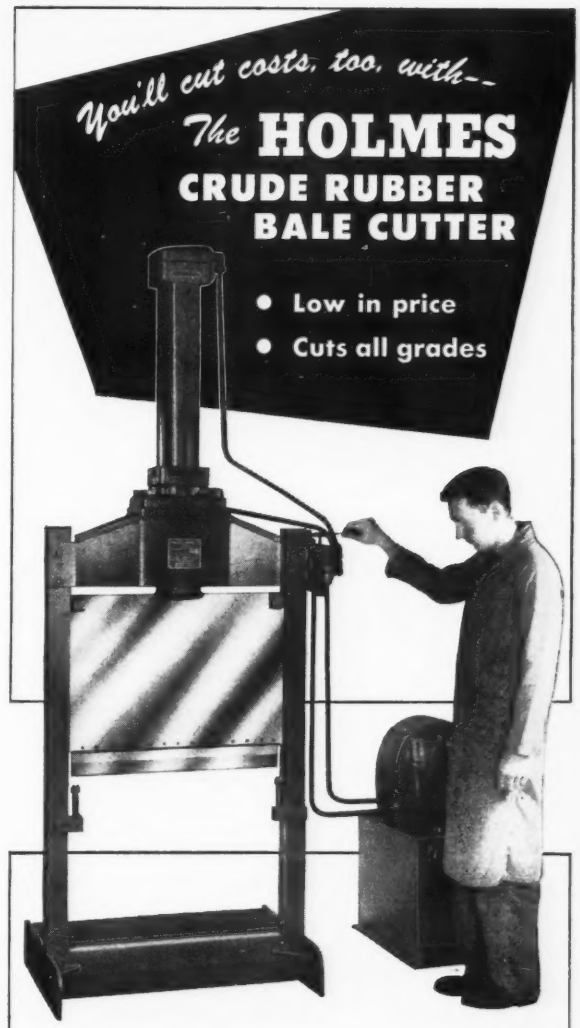
[2] *Elektrizitätswirtschaft*, 11, 264 (1949).

Other Rubber Industry Notes

The manufacture of Buna at the Huls Chemical Works got under way again in November, and monthly output is expected to reach 500 tons. Farbenfabriken Bayer, Leverkusen, converts a part of the intermediate product to Perbunan, the monthly output of which is about 100 tons.

The Buna chemical works at Schkopau are officially known as Staatliche A.G., Kautchuk, Schkopau. Produced are synthetic rubber, plastics, glycerine exchange materials, adhesives, solvents, synthetic oils, softeners for plastics, plasticizers for rubber, plastic emulsions, and a variety of other organic and inorganic products.

At the autumn Leipzig Fair held in 1951, exhibits revealed the considerable progress made in the production and application of



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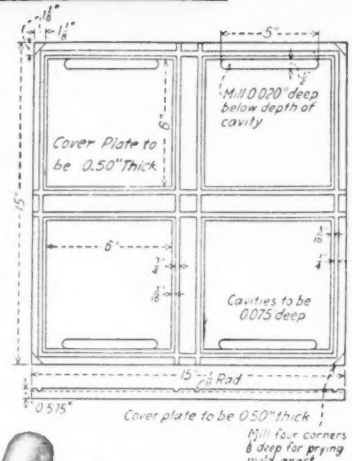

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plastics in the Eastern Zone. To a large extent, the need of saving metals has been responsible for this development. Thus plastics are replacing many parts formerly made of brass in telephone and telegraph apparatus. Hard and soft PVC, in particular, were used for a variety of goods—footwear, curtains, table covers, tubing, toilet seats, handbags, etc. It was also found used in the construction of refrigerators. A product that aroused some interest was a new "breathing" artificial leather consisting of layers of fabric ravelings embedded in plastic, in which the open, porous effect was achieved by alternately drying and roughing each layer. In the case of smooth-surfaced artificial leather, the same effect was obtained by perforation or pricking.

NETHERLANDS

The problem of supplying the more scattered communities of the province, Zeeland, in the Netherlands with drinking water, always a difficult one and usually met by carting the water in tanks or by the use of cisterns, is apparently finding a new solution. In one community, the authorities have resorted to laying water pipes of polythene which are connected to the water main, 600 meters away. The piping, produced by Draka, N. V. Hollandse Draad en Kabelfabriek, Amsterdam, is supplied in unusually long lengths.[1] This piping is light enough to permit up to 1,700 meters (more than a mile) to be rolled in one piece on a single drum and to be unreeled and laid directly in the earth without the need of any special devices.

Production of rubber goods reached unprecedented levels in Holland in the early part of the year; the index for March, 1951, was 395, against the base 100 for 1938. However, buyers' resistance to high prices was so marked that output had to be sharply curtailed, and by July the production index had dropped to 277.

A special number of *Rubber*, organ of Rubber Stichting, was issued on the occasion of the opening of the Institute's new building, along with a separately published collection of messages of appreciation and congratulation from heads of state departments in Holland and Indonesia, as well as from leaders in manufacturing and scientific circles in the international rubber world.

Stichting, one of the research and development units under the International Rubber Research Board and the International Rubber Development Committee, is financed by the rubber producers in Indonesia. It aims at expanding the consumption of rubber and to this end cooperates closely with the Indonesian Rubber Research Institute at Bogor, Java, British Rubber Producers' Research Association, British Rubber Development Board, Institut Français du Caoutchouc and Institut de Recherches sur le Caoutchouc en Indochine, Saigon.

The construction of the new building was made possible by cooperation of the Indonesian Government, and indication not only of that government's awareness of the importance of rubber for the Indonesian economy (rubber accounted for 54% of the total value of all exports from the territory in 1950, with the share of native rubber amounting to about 75%), but also of its confidence in the Stichting.

The special issue of *Rubber* is devoted almost entirely to discussions and illustrations of the various applications rubber has found in the new building. Rubber, in different forms, has been used wherever possible: in the letters forming the words "Rubber Stichting" above the entrance, in the grooved tiles on the steps, and in a variety of door mats; in the letters on the porter's cap and in the Ozuriet cables heating his booth; in the Elastoleum-tiled tables and floors of the canteen, and in the decorative panels with their Indonesian designs, used to hide blackboards in the lecture room, and in the double-textured curtains that exclude light, permitting films to be shown in daytime.

Several types of flooring are seen in different parts of the building—calendered inexpensive, linoleum-type Elastoleum; silent sponge-rubber backed rubber carpeting from Belgium; tiled floors of hydrochloride rubber; Semtex; and a number of others including some that are as yet only used in experimental strips. There are parquet floors rendered non-skid by narrow, slightly protruding rubber beads in the seams. In the lecture room, the first seven rows of chairs have rubber upholstery—four rows use foam rubber, some with, some without springs; in one row Recticel is employed, and in two Hairlok topped with foam rubber; the chairs in the remaining rows in the hall are fitted with the older type of cushions.

Cellaplast paint containing latex and prepared in delicate pastel tints cover walls and ceiling in one hall. There are ebonite flower boxes, rubber garbage pails, a drain-pipe provided with an

[1] *Kunststoffe*, 41, 9, 308 (1951).

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S-section of rubber which needs only to be squeezed to move obstructions, a flexible rubber door, etc. Various American, and other foreign firms besides Dutch firms, contributed equipment and rubber objects. But enough has been said to show that the Dutch have gone about the business of directly demonstrating (and incidentally testing by actual use) a wide variety of rubber applications with characteristic thoroughness, without need of special mention also of the pictures and other objects illustrating the history of rubber, its chemistry, and the different manufacturing and planting processes.

FAR EAST

MALAYA

After the murder of the High Commissioner, Sir Henry Gurney, last October, it might have been expected that immediate drastic action would have been taken against banditry in Malaya. But whatever steps had been undertaken were obviously inadequate since violence on an increased scale seems to have been the order of the day in several Malayan states during November, culminating about the middle of that month in an ambush on an estate in Perak in which 11 persons were murdered; an attack on a Royal train in Selangor, on practically the same day, when four persons were killed; and in a campaign of intimidation which forced thousands of estate laborers in the state of Negri Sembilan to stop work.

Those killed in the ambush included E. R. Corbett, director of Bidor Estate, Ltd., who had arrived from England only about a week earlier to inspect the company's plantations; C. W. Dicks, manager of the estate; and nine members of their police escort. The bandits were able to collect the arms of the dead men and to escape.

An industrial dispute on Bahau Estate, in Negri Sembilan, which took place on October 5, seems to have provided terrorists with a welcome pretext for their campaign among all tappers in the Bahau district, forcing them by threats and physical attacks to stop work. By the end of October results of the campaign became evident, and by the middle of November, about 8,000 badly frightened tappers had laid down their tools, leaving some 50,000 acres of rubber untapped.

Among the estates affected was the Ladang Geddes, belonging to Dunlop; this estate, the largest in the area, has an acreage of 14,000 and employs 2,200 persons.

In the fourth week of November, a large proportion of the laborers, encouraged by the strict curfew imposed by the government over the Bahau district and town, returned to work; on November 25, about 1,600 had reportly not yet returned to their labors.

In the beginning of December, 1951, Oliver Lyttelton, Secretary of State for the Colonies, visited Malaya in connection with the uneasy situation. In the course of discussions with delegates of various associations, planters told him that what they needed was more arms, especially automatic carbines of the American type.

At the annual meeting of the Malayan Association in Kuala Lumpur, W. M. McLeod, proposed a scheme by which up to 50% of the present sale price of rubber would be retained by an agency of the rubber industry in special deposit accounts from which drawings could only be made by producers if they could show that the money was not likely to fall into the hands of terrorists. Mr. McLeod added that before the rise in rubber prices, there had been evidence of widespread discontent in the ranks of terrorists, but when prices became high, the men were better paid. He held that at a conservative estimate, terrorists must now be collecting around $10,000,000 (Straits currency) a month from the sale of stolen rubber. The "small hard core of Communists in Malaya" might not be fighting for any immediate reward, but the vast majority of their gangs were only operating because they were paid, and McLeod feels that Communism in Malaya is nothing but a fabulously wealthy racket.

Hardly had the planters in one part of the country begun to breathe more freely after laborers began to return to their jobs in large numbers, than those in another part were faced with a different kind of hazard. Heavy rains and floods in South Malaya are said to have caused serious losses to estates in the latter part of November; there has been much damage, and wide areas have had to remain untapped.

Editor's Book Table

BOOK REVIEWS

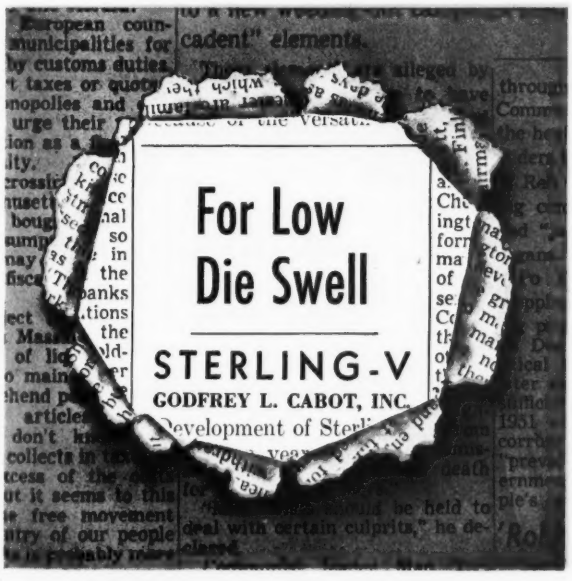
"Eléments de Science et de Techologie du Caoutchouc," Jean Le Bras. Societe d'Editions Techniques Coloniales, Paris, France. Cloth, 6½ by 10 inches, 354 pages.

At the request of the Council of the Institut Français du Caoutchouc, Dr. Le Bras, now Science Inspector General of this institute and of the Institute in Indo-China, in 1941 set about organizing within the research center of the Institut Français a technical course designed chiefly for the training of rubber engineers. As a first step, an elementary course was set up to provide that basic knowledge of the science and technology of rubber required for participation in the advanced course of the I. F. C. and, incidentally, to fill a gap in the programs of most higher educational institutions of France.

The course was necessarily restricted to the students of the Paris area; therefore, a condensed version of the course was arranged for the benefit of provincial students planning to go further; however, this still left them at a disadvantage with their Parisian fellows, and the Institut finally decided to publish, under the direction of Dr. Le Bras and with the aid of a number of technologists, the present handbook which puts at the disposal of students everywhere in France an exposition of all the material treated in the elementary course. Since the book also aims at filling the expressed needs of manufacturers, technologists in the provinces, and many persons of different educational backgrounds, all interested in rubber, it has been kept simple and direct so as to be as easy of comprehension as possible.

The oral part of the elementary course of the I.F.C. is amplified by lectures given by leading French authorities on current scientific and technological developments, and the work also utilizes their contents. A well-rounded survey of rubber is thus offered in the 15 chapters of the book, starting with the early history of rubber cultivation, manufacture and research and going on to the latest developments in these fields. The physical and chemical properties and structures of rubber and latex, tests and scientific theories, vulcanization, accelerators and compounding ingredients, factory processing and applications, are adequately discussed for the purpose of the work. Nor have synthetic rubbers been neglected. A list of French works on rubber, an index of authors quoted and a general index, complete the book.

As a matter of interest, we may mention the adoption in the book of a simplified method of representing organic structures which omits all C and all H atoms which are dispensable, thereby to aid the student to memorize them and especially to facilitate reasoning by high-lighting the points of reactivity in the molecules (the double bonds, carbonyl and carboxyl groups, heteroelements.).



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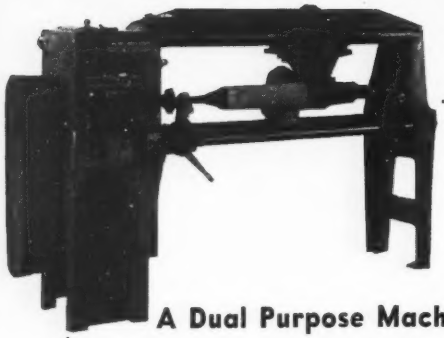

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Issued in commemoration of the Society's seventy-fifth anniversary, this book, comprising articles taken from the two magazines, describes the growth of the Society during the past 75 years and its interrelation with the growth of the American chemical industry. Significant developments in the history of the Society are covered in "The First 75 years," by Anthony Standen. The histories of the 19 Society divisions are presented by leaders in the respective fields, with rubber chemistry discussed by R. P. Dinsmore and plastics chemistry covered by C. R. Bragdon and M. M. Renfrew. Following these divisional histories are articles on contemporary problems facing the chemist as scientist, philosopher, business executive, and educator envision them. A final section presents a pictorial review of chemical progress during the period of the Society's existence. A brief description of the 1951 Diamond Jubilee meeting is also given, together with an appendix listing the A. C. S. councilors, committees, division officers, and local section officers.

NEW PUBLICATIONS

Bulletins of Columbia-Southern Chemical Corp., Fifth Ave. at Bellefield, Pittsburgh 13, Pa. **"Hi-Sil Inhalation Tests."** Pigment Data Bulletin No. 51-5. 4 pages. A summary is given of long-term toxicity tests on Hi-Sil conducted by the Saranac Laboratory. Tests results show that while not particularly hazardous, the material has the capacity to produce a slight change in the lungs after prolonged inhalation of the dust at high atmospheric concentrations.

"Silene EF-Calcene TM Combinations in GR-S Sundry and Molded Goods Compounds." Pigment Data Bulletin No. 51-6. 4 pages. Formulations and tests results show that Silene EF gives better properties than the same volume of ultra-fine calcium carbonate when used in combination with a ground whiting. Additional improvement in properties can be obtained by replacing the ground whiting with Calcene TM.

"B. F. Goodrich Men and Women 'Produce for Defense.'" The B. F. Goodrich Co., Akron, O. 14 pages. A pictorial review of some of the company's products for defense use, this booklet describes such items as military truck and airplane tires, tank tracks, life boats, insulated boots, medical equipment, bogie wheels for halftracks, gas mask covers, rubberized tents, hose, tapes, deicers, and others.

"Barrett Standard Industrial Chemicals." Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 16 pages. This bulletin offers concise information on properties and applications of the Barrett chemicals, including tar acids, tar acid oils, phthalic anhydride, plasticizers, phenolic resins, Cumar resin, Resin S, rubber compounding materials, naphthalene, coal-tar bases, niacin, light oil distillates, flotation agents, pickling inhibiters, tar distillates, nitrogen products, and specialty coating materials.

Publications of the Rubber Stichting, Delft, Holland. No. 122. **"The Structure of Cyclized Rubber."** G. J. Van Veersen. 18 pages. The history of cyclized rubber, including structural formulae previously proposed, is reviewed. A new formula for cyclized rubber is suggested by applying electronic interpretations of reactions between electrophilic agents and tertiary alkyl olefins and tertiary halides to the corresponding reactions between rubber and rubber halides. It is shown that hydrochlorination can be used for the determination of the unsaturation of cyclized rubber.

No. 127. **"Poisons du Caoutchouc et Antioxygenes."** G. Salomon. 5 pages. (In French.) This review paper discusses the effects of heavy metals, ozone, and dynamic fatigue on rubber from both the practical and theoretical viewpoints.

"Flintkote Industrial Products Digest." Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y. 24 pages. This pocket-size, illustrated booklet briefly covers many of the company's standard and specialized products for use in protective coatings, flooring binders and cements, sound insulating compounds, joint sealers, packaging specialties, and fiberboard sizes and laminants.

"Harflex Plasticizers." Hardesty Chemical Co., Inc., 41 E. 42nd St., New York 17, N. Y. 17 pages. This illustrated bulletin offers concise and systematic information on the composition, properties, and applications of the company's major sebacate, phthalate, and adipate plasticizers for rubbers and resins. Similar data are also given on butyl stearate, sebacic acid, and capryl alcohol.

"Some Factors Affecting the Use of Neoprene with Cellulosic and Other Acid Sensitive Materials." BL-243. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8 pages. This report discusses and presents data showing that the evolution of hydrochloric acid from neoprene can often be minimized to a point where the use of neoprene in fabric products is practical and valuable. Since the possibility of acid evolution does exist, this factor should be taken into account when neoprene is being used in contact with acid-sensitive materials.

"Pliovic, a Vinyl Resin for Calendering, Extruding, Molding." Goodyear Tire & Rubber Co., Akron 16, O. 30 pages. The properties of Pliovic are detailed, and extensive information given on its compounding and processing by means of calendering, extrusion, and molding. Applications are also discussed, together with the use of Pliovic for organosols and plastisols.

"Emery Esters for Synthetic Lubricants." Emery Industries, Inc., Carew Tower, Cincinnati 2, O. 12 pages. Detailed technical information is given on three Emery diesters for use in synthetic lubricants and specialty greases. Two of these products are esters of azelaic acid; while the third is the dibutyl ester of Emery 955 Dimer Acid (dilinoleic acid).

"Dollar Savings through Standards." American Standards Association, Inc., 70 E. 45th St., New York 17, N. Y. 32 pages. Price, $1. This report presents the results of a comprehensive survey of industrial savings realized by the use of standards. The report covers 140 case studies covering 81 industries and fields, with five of the studies relating to the rubber and the chemical industries. Some 2,100 member companies of the Association were polled for data on results obtained by their adoption of standards. Their answers, compiled in this survey, give measurable proof in terms of dollars and percentages of the savings accomplished by use of standards.

"Flexol Plasticizers." Carbide & Carbon Chemicals Co., Division of Union Carbide & Carbon Corp., New York 17, N. Y. 78 pages. Complete information on the properties and applications of 12 Flexol plasticizers for use in plastics, coatings, and rubber compounds appears in this booklet. Comparative properties of the different plasticizers are given by means of tables and diagrams. There are also detailed sections on the specific utility of the Flexols in vinyl dispersions, nitrocellulose lacquers, natural and synthetic rubbers, and plasticizer emulsions.

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SEE PAGE 396

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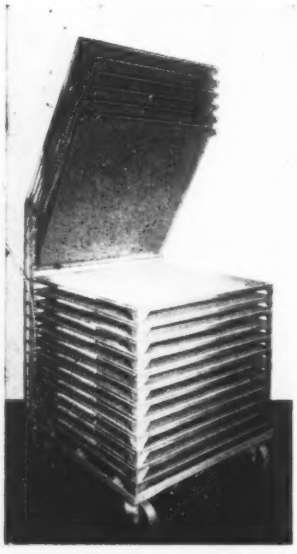

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MARKET REVIEWS

CRUDE RUBBER

EASIER prices in the foreign markets brought heavy purchasing of *Hevea* rubber to the point where both the January and the February arrival positions are believed to be pretty well covered. Purchasing was particularly heavy during the second half of November and tapered off in the first half of December. Unlike conditions in the preceding few months when most GSA purchases were of the off-grade rubbers, the foreign market price declines extended into the better grades, and large quantities of No. 2 smoked sheets were said to have been bought. The major factor behind the price decline was the report that government stockpile objectives will be attained in a few months and stockpiling no longer will afford a support to the market.

A drastically scaled down version of Allocation Order M-2, issued by NPA in mid-December, lifted ceilings on total new rubber consumption beginning January 1. Limitations will be retained only on industry use of natural rubber and butyl, the former to be held at the current level of about 30,000 tons a month at least until July. If forecasts of fulfilling the stockpile objectives are achieved by that date, restrictions may then be taken off natural rubber to make thousands of additional tons available for industrial use. All limitations on use of GR-S are removed as of January 1, with some 860,000 tons to be produced during 1952, but RFC will sell only to regular consumers or those holding government export licenses. An export quota for GR-S has been set up to permit exports of 10,000 tons in the first quarter.

The domestic rubber industry has submitted a plan to GSA providing for the gradual withdrawal of government purchasing of *Hevea* over a four-month period. This plan assumes that stockpile goals will be achieved by March 31 at the latest. If this be the case, the plan suggests that private importation start on February 1 and government importation end by June 1. The plan calls for purchasing of natural rubber for April and May delivery by both the government and private industry, with industry having the option of filling April and May requirements by either private importation or from government purchases. Under the plan the only government rubber available for industry consumption after June 1 would be stockpile rotation rubber not fit for further stockpiling. During the period of combined private and government importation, industry should not be permitted to pay more for its rubber than the GSA selling price, according to the plan. This practice would prevent an inflationary trend in world rubber markets.

Removal of GSA control over natural rubber importation would still leave the government with considerable authority over the domestic rubber industry. NPA has the power to limit consumption of rubber, to limit inventories, and to specify the types and percentages of rubbers for use in the manufacture of specific products.

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., suggested on December 29 that 300,000 acres of new rubber plantings, which ultimately would yield 150,000 tons of natural rubber be developed in the Western Hemisphere zone stretching from the southern part of Mexico to Brazil and Bolivia. Litchfield estimated the cost of such development at $100,000,000, spread over six to seven years up to the point of tapping the trees.

The purpose of the new program would be to create a *living* stockpile in this hemisphere and thus cut down on the present strategic storage program, it was said.

Latices

PRIVATE trading in *Hevea* latex will not be resumed until all government owned latex can be sold. This time is not expected to be until the end of March or middle of April, according to Arthur Nolan, Latex & Rubber, Inc., writing in the December issue of *Natural Rubber News*. In order that latex stocks be on hand when government supplies are exhausted, it is expected that private latex shipments may be allowed starting in February, but a definite announcement to this effect has yet to be made by GSA. While GSA continues as the sole seller of *Hevea* latex, the price is expected to continue at a premium of 12¢ a pound, dry weight, over the prevailing price for No. 1 smoked sheet.

Domestic imports of *Hevea* latex during September totaled 1,800 long tons, dry weight; consumption, 3,454 long tons; and month-end industry stocks, 5,573 long tons. October estimates are for imports of 3,500 long tons; consumption, 3,900 long tons; and month-end industry stocks, 6,000 long tons.

September production of GR-S latex amounted to 2,748 long tons, dry weight; imports, 103 long tons; consumption, 2,610 long tons; and month-end stocks, 3,621 long tons. October estimates follow: production, 2,800 long tons; imports, 100 long tons; consumption, 3,004 long tons; and month-end stocks, 3,516 long tons. Some technical difficulties have arisen with the cold latices, particularly with respect to uniformity, but these problems are expected to be overcome as further manufacturing experience is gained. Demand for the cold latices is very strong owing to their favorable properties and prices in comparison with *Hevea* latex, and an expansion in productive capacity will take place during the first quarter of 1952.

RECLAIMED RUBBER

SALES of reclaimed rubber were quite poor in November owing to strikes in consuming plants and the reduction in battery container production resulting from the lead shortage. Reports that one of the major automobile manufacturers is advocating the use of brighter colors in auto floor mats indicate a trend that may seriously curtail an important market for reclaim. The long-range outlook for the reclaim industry continues optimistic, however, as long as reclaim prices remain competitive with new rubber prices. New technical developments in reclaim are under way, and the sales volume for 1952 is expected to be satisfactory.

Final September and preliminary October statistics on the domestic reclaimed rubber industry are now available. Final September figures show a production of 26,885 long tons; imports, 42 long tons; consumption, 26,226 long tons; exports, 970 long tons; and month-end stocks, 43,095 long tons. Preliminary figures for October give a production of 29,624 long tons; consumption, 28,073 long tons; exports, 1,305 long tons; and month-end stocks, 45,299 long tons.

There were no changes in reclaimed rubber market prices during the period from November 16 to December 15. In general, prices were at the OPS ceilings given in our September issue, page 756.

SCRAP RUBBER

THE scrap rubber market was rather quiet during the period from November 16 to December 15. Tires moved in limited quantities, with reclaimers making purchases only to meet immediate needs. Consuming new purchases as they arrive saves both time and labor for the reclaimers since most scrap stocks are stored outdoors and, by this time, are fairly well soaked from the snow and rain.

Tire parts were said to be moving spasmodically, with prices leveling off at Akron and in the East. Scrap tubes showed easier prices in view of almost complete disinterest by the reclaiming mills. In general, the flow of scrap rubber from outlying areas is almost non-existent owing to the high freight rates and the onset of winter weather. The holiday season also contributed to the continuing dullness of the market. Scrap export business continues to decline because of the growing scarcity of dollar exchange among former heavy foreign purchasers.

OPS ceiling prices for scrap rubber appeared in our September issue, page 756. Following are dealers' actual selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated.

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$20.00	$20.00
Peelings, No. 1	55.00	58.00
3	29.00	29.00
	(¢ per Lb.)	
Black inner tubes	6.5	7.0
Red passenger tubes	10.00	10.00

RAYON

ESTIMATED November shipments of rayon by United States producers to domestic consumers were 84,000,000 pounds, an increase of 1,800,000 pounds over the October level, but still 24% below the monthly average for the second quarter of this year. Viscose high-tenacity yarn has been holding at near record levels, with 29,700,000 pounds shipped during November. Calculated production of high-tenacity yarn during November shows

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Merit Western Co.
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29,800,000 pounds, or about 99% of capacity.

A mid-November survey of the domestic rayon producing industry, made by the Textile Economics Bureau, Inc., showed an annual viscose high-tenacity production capacity of 360,000,000 pounds. Plant expansions and new construction are expected to increase this annual capacity to 370,000,000 pounds by July, 1952; 403,000,000 pounds by March, 1953; and 434,000,000 pounds by October, 1953.

No changes were made in rayon tire yarn and fabric prices during the period from November 16 to December 15, and current prices follow:

Rayon Prices

Tire Fabrics

1100/490/2		$0.72
1650/980/2	$0.695 /	.73
2200/980/2		.685

Tire Yarns

1100/480	.62 /	.63
1100/490		.62
1150/490		.62
1650/720	.61 /	.62
1650/980		.61
1900/980		.61
2200/960		.31
2200/980		.60
4400/2934		.66

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Oct. 27	Nov. 17	Nov. 24	Dec. 1	Dec. 8	Dec. 15
Mar.	37.45	41.25	42.23	43.28	43.58	41.90
May	37.23	41.17	42.05	43.15	43.38	41.53
July	36.73	40.56	41.55	42.80	42.83	41.15
Oct.	35.50	38.30	39.00	39.90	39.90	38.30
Dec.	35.40	38.05	38.83	39.48	39.25	37.95
Mar.	35.43	37.92	38.70	39.30	39.10	37.82

PRICES on the New York Cotton Exchange showed strong fluctuations during the period from November 16 to December 15. The second half of November and the first week of December featured an irregular price advance underlined by mill fixations, active foreign interest, and expectations of a low crop estimate by the government. With the release of the estimate, prices began a decline as growers placed increased offerings on the market while mills withdrew to await further developments.

The semi-final crop estimate released by the government on December 10 placed production at 15,290,000 bales; each bale is 500 pounds in gross weight. This estimate represented a reduction of 481,000 bales, or 3% from the November 8 estimate, and was somewhat higher than most trade expectations.

The spot price for 15/16-inch middling cotton started the period at 42.90¢ a pound, dropped back to a low of 42.10¢ on November 17, advanced irregularly to a high of 44.45¢ on December 8, and then fell to close the period at 42.75¢. Futures prices showed corresponding movement, with March futures quoted at 41.90¢ on December 15.

Fabrics

The cotton gray goods market was dull throughout the period from November 16 to December 15. Most mills were reported to have reduced their inventories to a minimum and to have curtailed production to meet only actual orders. With the continuing poor demand for gray goods and the erratic fluctuations of raw cotton market prices, most mills were content to remain withdrawn while awaiting more settled conditions. Market inactivity is reflected in the nominal quotations for many fabric constructions shown in the table below.

Cotton Fabrics

Drills

59-inch 1.85-yd.	yd.	nom.
2.25-yd.		nom.

Ducks

38-inch 1.78-yd S. F.	yd.	nom.
2.00-yd. D. F.	yd.	nom.
51.5-inch, 1.35-yd, S. F.		nom.
Hose and belting		$0.80

Osnaburgs

40-inch 2.11-yd.	yd.	.30
3.65-yd.	yd.	.165

Raincoat Fabrics

Print cloth, 38½-inch, 64x60	$0.16½
Sheeting, 48-inch, 4.17-yd.	nom.
52-inch 3.85-yd	nom.

Chafer Fabrics

14-oz./sq. yd. Pl.	lb.	.85
11.65-oz./sq. yd. S.		.78
10.80-oz./sq. yd. S.		.82
8.9-oz./sq. yd. S.		.835

Other Fabrics

Headlining, 68-inch 1.35-yd., 2-ply	yd.	nom.
64-inch, 1.25-yd. 2-ply		nom.
Sateens, 53-inch 1.32-yd.		.71
58-inch 1.21-yd.		.775

Tire Cords

K. P. std., 12-3-3	lb.	nom.
12-4-2		.90

United States Rubber Statistics—September, 1951

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	59,609	59,609	33,462	27	51,421
Latex, total	0	1,800	1,800	3,425	0	5,520
Rubber and latex, total	0	61,409	61,409	36,887	27	56,941
Synthetic rubbers, total	*64,279 †6,591	523	71,393	68,460	393	99,889
GR-S types‡	*57,964 †7	381	58,352	57,548	40	80,938
Butyl	*6,315	142	6,457	5,977	0	7,341
Neoprene‡	†5,372	0	5,372	3,883	796	7,580
Nitrile types‡	†1,212	0	1,212	1,052	159	4,030
Natural rubber and latex, and synthetic rubbers, total	70,870	61,932	132,802	105,347	022	156,830
Reclaimed rubber, total	26,885	42	26,927	26,226	970	43,095
GRAND TOTALS	97,765	61,974	159,729	131,573	992	199,925

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory—October, September, 1951; First 10 Months, 1951, 1950

	Oct., 1951	% Change from Preceding Month	Sept., 1951	First Ten Months, 1951	First Ten Months, 1950
Passenger Casings					
Shipments					
Original equipment	2,101,876		2,104,689	23,306,327	1,025,926
Replacement	3,242,468		3,020,671	29,943,005	40,408,236
Export	78,305		79,837	590,856	498,761
TOTAL	5,422,649	+4.18	5,205,197	53,840,188	71,932,923
Production	6,076,880	+3.25	5,885,873	55,060,086	86,631,590
Inventory end of month	4,315,374	+19.28	3,617,900	4,315,374	7,483,383
Truck and Bus Casings					
Shipments					
Original equipment	451,256		413,884	4,646,805	3,864,321
Replacement	1,072,632		946,447	8,818,472	8,080,940
Export	103,056		91,517	706,396	653,420
TOTAL	1,626,944	+12.06	1,451,848	14,171,673	12,598,681
Production	1,669,426	+8.16	1,543,469	14,620,538	12,782,680
Inventory end of month	1,198,371	+4.29	1,149,043	1,198,371	898,902
Total Automotive Casings					
Shipments					
Original equipment	2,553,132		2,518,573	27,953,132	34,890,247
Replacement	4,315,100		3,967,118	38,761,477	48,489,176
Export	181,361		171,354	1,297,252	1,152,181
TOTAL	7,049,593	+5.90	6,657,045	68,011,861	84,531,604
Production	7,746,306	+4.27	7,429,342	69,680,624	78,414,270
Inventory end of month	5,513,745	+15.67	4,766,943	5,513,745	4,382,285
Passenger (Including Motorcycle) and Truck and Bus Tubes					
Shipments					
Original equipment	2,548,803		2,522,230	27,972,998	34,849,373
Replacement	2,911,411		2,433,474	28,537,404	36,760,942
Export	154,350		113,657	825,168	634,214
TOTAL	5,614,564	+10.75	5,069,361	57,335,570	72,244,529
Production	6,276,938	+10.24	5,693,747	56,822,285	67,515,285
Inventory end of month	7,471,450	+9.33	6,833,736	7,471,450	6,400,392

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	August, 1951 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	148,325,335	$70,536,735
Latex	10,144,311	5,805,789
Crude chicle	288	166
Guayule	331,300	93,807
Balata	371,125	136,723
Jelutong or Pontianak	319,130	224,194
Gutta percha	17,267	7,060
Synthetic rubber	1,388,361	383,994
Reclaimed rubber	314,441	49,691
Scrap rubber	3,470,334	222,092
TOTALS	164,481,892	$77,460,051
MANUFACTURED		
Tires and casings		
Auto, etc. *no.*	5,846	$197,696
Bicycle *no.*	5,062	4,326
Other *no.*	40	686
Inner tubes, auto etc. *no.*	207	700
Rubber footwear		
Boots *prs.*	14,039	37,151
Shoes and overshoes *prs.*	38,648	20,355
Rubber-soled canvas shoes *prs.*	6,241	5,526
Athletic balls:		
Golf *no.*	79,146	21,411
Other, except tennis *no.*	7,530	1,745
Rubber toys, except balloons	.....	22,190
Hard rubber goods		
Combs *gross*	59,176	5,540
Sundries	.....	3,399
Other	.....	63,532
Rubber and friction tape *lbs.*	10	2
Rubberized printing blankets *lbs.*	2,104	4,653
Rubber and cotton packing *lbs.*	1,047	1,559
Gaskets and valve packing	.....	4,868
Molded insulators	.....	552
Belting *lbs.*	9,976	15,670
Hose and tubing	.....	44,007
Drug sundries	.....	7,330
Instruments *doz.*	825	8,612
Other rubber products	.....	205
Gutta percha manufactures *lbs.*	5,215	5,802
Rubber bands *lbs.*	34,264	37,296
Synthetic rubber goods	.....	1,135
Other soft rubber manufactures	.....	118,157
TOTALS	.....	$644,205
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$78,104,256

Exports of Domestic Merchandise

	August, 1951 Quantity	Value
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	154,546	$65,351
Synthetic rubbers		
GR-S types	39,224	10,965
Butyl	483,046	100,233
Neoprene	883,266	354,343
Nitrile types	319,919	160,642
"Thiokol"	1,120	677
Polyisobutylene	2,257	1,017
Other	12,171	7,783
Reclaimed rubber	2,219,645	221,658
Scrap rubber	1,637,284	104,985
TOTALS	5,752,478	$1,027,654
MANUFACTURED		
Rubber cement *gals.*	64,708	130,713
Rubberized fabric		
Auto cloth *sq. yds.*	13,096	22,105
Piece goods and hospital sheeting *sq. yds.*	77,042	85,095
Rubber footwear		
Boots *prs.*	8,768	44,543
Shoes *prs.*	8,925	30,879
Rubber-soled canvas shoes *prs.*	12,567	27,707
Soles *doz. prs.*	10,623	38,608
Heels *doz. prs.*	98,705	102,490
Soling and toplift sheets *lbs.*	372,644	86,239
Gloves and mittens *doz. prs.*	21,930	85,468
Drug sundries		
Hot water bottles and fountain syringes *no.*	21,067	14,955
Other	.....	253,147
And rubberized clothing	.....	113,999
Toy and novelty balloons	.....	21,016
Toys and balls	.....	28,567
Erasers, except pencil *lbs.*	20,394	18,921
Hard rubber goods		
Battery boxes *no.*	20,500	$49,518
Other electrical goods *lbs.*	145,541	93,891
Combs, finished *doz.*	2,646	3,572
Other	.....	12,142
Tires and casings		
Truck and bus *no.*	68,541	3,910,566
Auto *no.*	57,862	966,984
Aircraft	.....	202,096
Farm tractor, etc. *no.*	5,772	223,815
Other off-the-road *no.*	8,409	1,118,432
Bicycle *no.*	12,497	17,173
Motorcycle *no.*	616	5,863
Other *no.*	2,260	76,091
Inner tubes: auto *no.*	39,484	88,000
Truck and bus *no.*	48,951	217,200
Aircraft *no.*	393	3,382
Other *no.*	15,723	43,225
Solid tires: truck and industrial *no.*	2,594	47,579
Other *lbs.*	13,762	6,974
Tire repair materials		
Camelback *lbs.*	220,096	79,770
Other *lbs.*	398,124	358,769
Rubber and friction tape *lbs.*	84,306	62,895
Belting: auto and home *lbs.*	144,899	194,496
Transmission		
V-belts *lbs.*	142,224	307,792
Flat belts *lbs.*	56,357	92,963
Other *lbs.*	40,101	63,081
Conveyor and levitator *lbs.*	146,702	187,889
Other *lbs.*	81	241
Hose and tubing *lbs.*	673,048	568,911
Packing *lbs.*	200,570	237,229
Mats, flooring, tiling, *lbs.*	417,588	120,161
Thread: bare *lbs.*	2,180	4,249
Textile covered *lbs.*	14,832	52,361
Compounded latex and other rubber for further manufacture *lbs.*	558,044	$255,266
Other natural and synthetic rubber manufactures	.....	499,296
TOTALS	.....	$11,275,928
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$12,303,582

Reexports of Foreign Merchandise

	August, 1951 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	355,641	$290,479
Balata	21,117	16,317
TOTALS	376,758	$306,796
MANUFACTURED		
Rubber boots *prs.*	82	$321
Gloves and mittens *doz. prs.*	30	119
Drug sundries, except water bottles and syringes	.....	220
Toys and balls	.....	14,598
Packing *lbs.*	2,068	1,188
Other natural and synthetic rubber manufactures	.....	207
TOTALS	.....	$16,653
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$323,449

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

Compounding Ingredients—Price Changes and Additions

Accelerator-Activators, Organic

Emersol 110 *lb.*	$0.1125 /	$0.125
120 *lb.*	.1175 /	.13
130 *lb.*	.14 /	.1525
210 Elaine *lb.*	.1375 /	.145
Emery 600 *lb.*	.10 /	.1275
Hyfac 430 *lb.*	.17 /	.1825
431 *lb.*	.18 /	.1925

Carbon Blacks

(CC) Kosmos Dixie BB *lb.*	.195 /	.25
(EPC) Kosmobile 77/Dixie-densed 77 *lb.*	.07 /	.1225
(HPC) Kosmobile S/Dixie-densed S *lb.*	.07 /	.1225
(MPC) Kosmobile S-66/Dixie-densed S-66 *lb.*	.07 /	.1225
(FEF) Arovel *lb.*	.06 /	.10
(FEF) Kosmos 50/Dixie 50 *lb.*	.0575 /	.10
(Haf) Kosmos 60/Dixie 60 *lb.*	.0575 /	.1175
(HMF) Kosmos 40/Dixie 40 *lb.*	.0525 /	.095
(SRF) Kosmos 20/Dixie 20 *lb.*	.0375 /	.08

Reinforcers, Other Than Carbon Black

Pliolite S-3, -6, -6B *lb.*	.42 /	.49
S-6C *lb.*	.52 /	.59
S-Master batches *lb.*	.44 /	.75

Kel-F Prices Reduced

A reduction of more than 10% in the price Kel-F fluorocarbon-type plastic was announced by M. W. Kellog Co., New York, N. Y. New prices for the low and high density molding powders in ton lots are now $11 and $12 a pound, respectively, a decrease in each case of $1.30. Prices for plasticized molding powders were also cut an average of $3 a pound as a result of lowering the plasticizer cost to $12 a pound. Prices of Kel-F dispersions remained unchanged at $15 a pound of solids content. The price reductions were said to result from expanded production facilities to meet steadily rising demand.

Carbon Black Statistics — Third Quarter, 1951

Following are statistics for production, shipments, producers' stocks, and exports of carbon black for the third quarter, 1951. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black. Statistics on thermal black are included with SRF black to avoid disclosure of individual company operations.

(Thousands of Pounds)

	July	Aug.	Sept.
Production:			
Furnace types:			
SRF	31,966	35,361	32,194
HMF	10,782	11,311	11,810
FEF	18,544	17,721	18,883
HAF	29,024	30,449	29,294
Total furnace	90,316	84,842	92,181
Contact types	55,421	43,707	51,620
TOTALS	145,737	149,549	143,801
Shipments:			
Furnace types:			
SRF	31,717	33,495	30,795
HMF	11,973	11,179	9,284
FEF	16,743	15,080	16,372
HAF	25,069	25,604	26,587
Total furnace	85,502	85,358	83,038
Contact types	49,524	45,823	48,063
TOTALS	135,026	131,181	131,101
Producers' Stocks, End of Period:			
Furnace types:			
SRF	4,035	4,901	7,300
HMF	5,057	5,189	7,715
FEF	4,558	7,199	9,710
HAF	16,359	21,204	23,911
Total furnace	30,009	39,493	48,636
Contact types	78,574	87,458	91,105
TOTALS	108,583	126,951	139,651
Exports:			
Furnace types	13,295	11,311	9,077
Contact types	23,194	21,847	21,116
TOTALS	36,489	33,158	30,193

SOURCE: Bureau of Mines, United States Department of the Interior, Washington 25, D. C.

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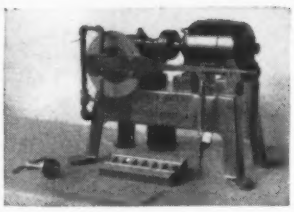

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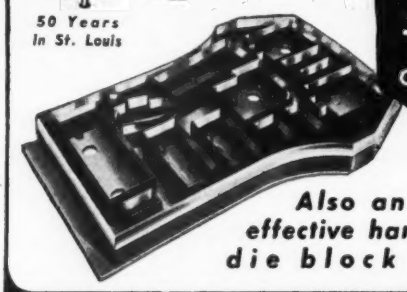

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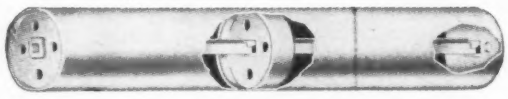

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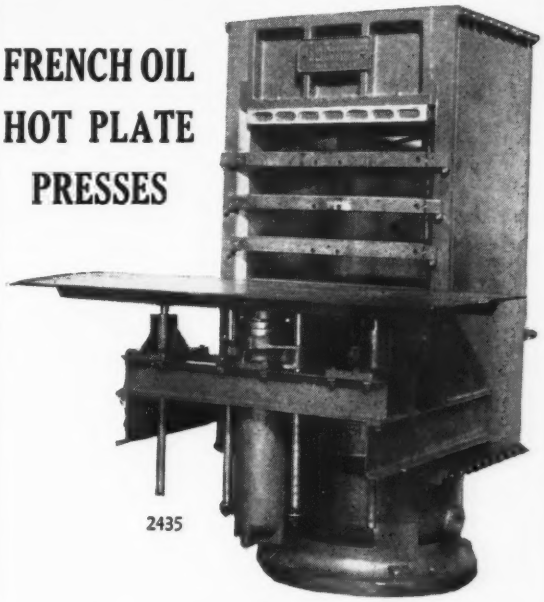

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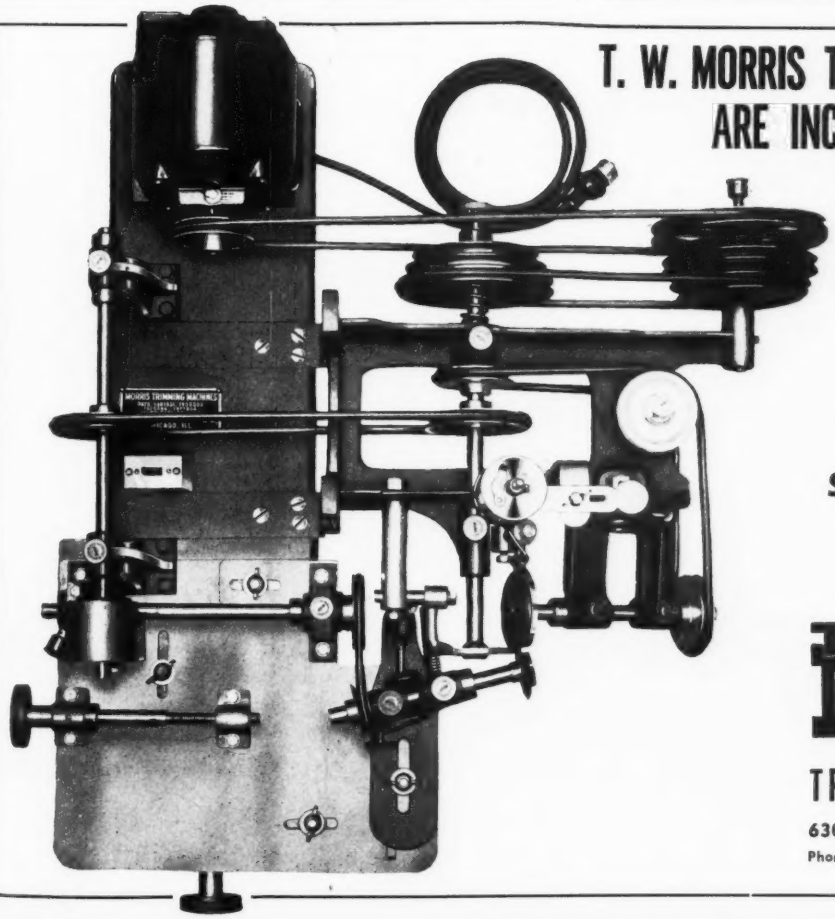

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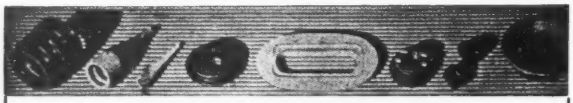

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